



The School Readiness of Australian Indigenous Children:

A Review of the Literature

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1 Introduction

This review seeks to explore the literature for evidence on the definition of school readiness in an Australian Indigenous context (Section 3) and effective assessment techniques of school readiness for Indigenous children (Section 4). Thereafter, salient risk and protective factors influencing the transition to school are mapped out (Section 5). This facilitates the anticipated outcome of the review: an appraisal of the effectiveness of interventions in mediating for risk factors and capitalising on protective factors that improve school readiness and transition to school in the Australian Indigenous context (Section 6).

2 Methodology

The primary search strategy systematically reviewed literature on the definitions, assessment methods, risk and protective factors and interventions related to the school readiness of the Australian Indigenous population. A key aim was the search for evidence related to these topics. A second literature search focused on supporting evidence from the International literature. School readiness evidence for analogous Indigenous populations of New Zealand and North America and other socio-economically disadvantaged or minority status populations was identified. The review includes English language literature published between 1971 and 2008 and focused on children less than eight years of age. Appendix A provides a summary of databases, search terms and search outcomes.

In the first instance included studies had to: a) Seek to answer a question of effectiveness or explain factors contributing to the success or failure of an intervention program; b) Have as its aim improving school readiness/transition (defined as reaching appropriate cognitive, socio-emotional, and developmental goals); c) Provide at least one measurable child focused outcome or provide qualitative data on critical success factors or barriers to success; d) Have outcome data at school entry or later. Studies were excluded if they: a) Include participants who are in institutional care (Hospitals, Institutional homes etc.); b) Target participants with intellectual disability or psychiatric conditions; c) Target participants on the basis of prematurity or developmental delay secondary to the presence of underlying organic disease.

The results of these electronic searches were supplemented with grey literature from key Government and NGO websites. Hand searches of other literature reviews and edited volumes for Indigenous Australia were also employed and a consultation process helped locate research that has yet to go to print. These sources also provided access to less-easily accessible and unpublished literature, which was useful since Indigenous research and grey literature often fails to reach a wider audience.

Evidence was classified in the first instance on an adapted National Health and Medical Research Council scale (Table 2.1). Adaptation was deemed necessary because studies of school readiness have a broad mixture of quantitative, qualitative and theoretical origins and outcomes. Studies were rated in terms of quality of evidence (size, design, quality and setting). A scale developed for a review of the literature on the

effectiveness of population-based preventive interventions on Indigenous early child development and growth (Moberley and Carapetis, 2007) is applied to the school readiness interventions assessed in Section 6 (Table 2.2). Previously undertaken systematic and narrative reviews are cited to signpost other perspectives of the literature.

Table 2.1 Evidence classification scale

Type of Study	Classification	Definition
Quantitative	i.	Evidence obtained from a systematic review of all relevant randomised controlled trials (RCTs)
	ii.	Evidence obtained from at least one properly designed RCT
	iii.	Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time-series without a parallel control group
	iv.	Evidence obtained from case series, either post-test or pre-test and post-test
	v.	Evidence obtained from census material or other quantitative survey of population
Qualitative	Q.	Evidence obtained from qualitative interviews, focus groups or ethnographies
Theoretical	T.	Hypothesis, conjecture or opinion not supported by specific research findings

Source: Externally adapted from National Medical and Health Research Council Rating Scale

Table 2.2 Assessment of Quality of Evidence

Quality rating	Definition
1	Evidence of no benefit. This includes interventions for which there is either a systematic review, well designed and adequately powered randomised controlled trial, or consistent comparative studies.
2	No evidence of benefit. An intervention for which low level evidence of lack of effectiveness is present, but study design precludes final conclusions regarding effectiveness.
3	Uncertain evidence of benefit; these interventions merit further assessment. This includes interventions for which there is evidence in non comparable settings, or study design precludes conclusions regarding effectiveness.
4	Evidence of efficacy but lack of evidence in large scale programming.
5	Evidence of efficacy and effectiveness which seem feasible for large scale implementation.

Source: Moberley and Carapetis (2007: 31)

3 Defining school readiness for Australian Indigenous children

School readiness is often a misunderstood term because of a tendency to confound readiness to learn (having the neurological capacity to undertake learning of specific material) with readiness for school (being developed for school based learning, having an ability to meet school requirements and to assimilate curriculum) (Kagan and Rigby, 2003: 2; Janus and Offord, 2007: 5). The prerequisites for schooling include having the capacity to follow directions, knowing not to be disruptive in class and how to be sensitive to others (Wright et al, 2000: 114; Rhode Island Kids Count, 2005; Arnold et al, 2007: 5). Accordingly, school principals, teachers, and pupils emphasise the importance of social skills and ‘fitting in’ at school as important factors for school readiness in addition to cognitive skills (Lockwood and Fleet, 1999: 19; Wright et al, 2000: 113; Dockett and Perry, 2002: 68, 81; Arnold et al, 2007: 5).

In Australia, the major criterion for children starting school is age (Dockett et al, 2008: 17), despite age not being an absolute predictor of success in school (Meisels, 1999 in Dockett and Perry, 2002: 70), since children of the same age are not at the same developmental stage and development occurs at different rates (DEST, 2005b: 61). Moreover, “in most States, there can be a chronological age span of some two years as children start school between about four-and-a-half and six years old” (Elliott, 2006: 17). By contrast, the recent literature has a common theme that school readiness is a ‘holistic’ concept, incorporating cognitive, socio-emotional, and physical components (Janus and Offord, 2007: 2). Accordingly, five domains of school readiness are consistently outlined: motor development, emotional health, social knowledge, language skills and general knowledge (Janus and Offord, 2007: 5-6; ARACY, 2006; Arnold et al, 2007: 5). An even broader ‘ecological’ view of school readiness recognises the influence of family, community, school, and services on a child’s readiness for school (Bronfenbrenner, 1999; ARACY, 2006: 5), whereby all of these elements contribute towards a smooth transition towards school readiness. This definition encompasses more than the skills and attributes of the individual child as salient components of school readiness. Thus, *ready services* deliver quality and affordable proven school readiness programs, *ready schools* foster relationships with families and communities and are geared and resourced for child development, *ready communities* provide appropriate support and resources to families and *ready families* create facilitative home environments (Rhode Island Kids Count, 2005: 12; Kagan and Rigby, 2003: 16).

How does such a holistic definition of school readiness accord with Indigenous Australian contexts? Ostensibly, these broader definitions of school readiness would appear to accord with an Indigenous construct of early child development, because Indigenous cultures are described as being holistic in nature (Hanlen, 2007: 232) and Australian Aboriginal learning systems are considered as circular or cyclic (Martin, 2007: 2). For example, Canadian Indigenous people call for holistic learning systems that acknowledge the influence of parents, extended family, Elders and community (Assembly of First Nations, 2005: 10). However, it is difficult to determine if a single definition of school readiness is suited to all Indigenous

children, given the heterogeneity of Indigenous culture, such that “Indigenous people not only live across a very different range of geographical settings ... but also experience a range of different lifestyles within these communities ... awareness and understanding of the complex and often delicate nature of the social and cultural issues at play within and between these communities is critical if Aboriginal learners are to achieve equitable educational outcomes” (Clancy and Simpson, 2002: 54-5). The remainder of this section of the review will examine the evidence base for defining components within the four thematic areas of the ecological definition of school readiness (ready services, ready schools, ready communities and ready families) specific to Indigenous populations. The results of this review are summarised in Table 3.1.

Ready Services

We found no research evidence specifically concerned with defining components of the readiness of services for schooling of Indigenous children (Table 3.1). A number of reviews and opinion pieces have identified areas of concern which may provide a basis for future research. Parenting classes or receipt of home visits that could encourage effective parenting amongst Australian Indigenous populations are described as insufficient (SNAICC, 2004a: 12). Another issue concerns the degree of continuity between preschool and school. It has been suggested that Indigenous Australian children need to be introduced early in life to a ‘schooling culture’ if they are to make a successful transition to Western-style school (NTDE, 1999: 96) and McRae et al (2000) view access to play based and structured preschool programs as important bridges between home and school, which may be longer and more difficult for Indigenous children to traverse (McRae et al, 2000: 48). Thus, Arnold et al (2007) advocate a ‘transition’ policy framework linking early childhood development programs to the early years of school (Arnold et al, 2007: 26).

Ready Schools

It is the “responsibility of schools to be ready for children: to offer them a supportive environment that enables them to blossom and learn effectively” (Arnold et al, 2007: 3). Qualitative evidence from an Australian Council of Education Research longitudinal study of 152 Indigenous students identified school environment as an important predictor of literacy and numeracy achievement amongst 11 high-performing Indigenous students during their first two years of schooling (Frigo et al, 2004: 6, 37, 40) (Table 3.1). What is actually meant by ‘school environment’ was not defined or problematised by Frigo et al (2004). What are the key factors of school environment that the research suggests make schools ready for Indigenous students? An earlier study (Purdie et al, 2000) interviewed Indigenous students, parents/carers and Indigenous and Non-Indigenous staff in 44 schools across Australia (Purdie et al, 2000: 36) and also provided qualitative evidence stressing the importance to Indigenous children of feeling welcome and included in their school. It is also widely reported in working papers (Arnold et al, 2007: 3), position statements (NAEYC, 2005: 26) and opinion pieces (Briggs and Potter, 1999: 76) that children need to feel welcome and included in their school regardless of culture or ethnicity. No other methodologically rigorous study of this issue was identified by this review.

It is widely accepted that to encourage a “sense of belonging” (Losley, 1995: 312) amongst all students, schools need to ensure a visible and non-stereotypical presence of their respective culture. Indeed, the importance of creating culturally-appropriate contexts for all English language learners is recognised in a position statement by the United States ‘National Association of Early Childhood Specialists’ (NAEYC, 2005: 26). In Australia, there is some qualitative evidence that Indigenous cultural presence in schools encourages a ‘sense of belonging’ amongst Indigenous students (Table 3.1). This is supported by other qualitative evidence: a survey of 34 key stakeholders from Indigenous organisations specialising in child, youth or family welfare (SNAICC, 2004b: 10); case studies with Indigenous children (Frigo and Adams, 2002: 3); interviews with teachers and Indigenous children and their parents (Dockett et al, 2006: 141, 143). However, interviews with Indigenous respondents suggest that “culture and traditions have been lost for most Indigenous children and young people” (SNAICC, 2004b: 10), which may make it difficult for schools to know how to create a receptive environment for Indigenous students. Therefore, what cultural adaptations to schools make a difference to Indigenous educational outcomes and how can there be any concrete assurance that this has an effect on educational outcomes? Qualitative studies (Frigo and Adams, 2002: 3; Dockett et al, 2006: 141) suggest that schools should have an Indigenous staff presence, in the form of teachers, tutors and Aboriginal and Torres Strait Islander Education Workers (AIEWs). In a regression analysis of census data (evidence rating: v), Biddle (2007) found the presence of an Indigenous preschool worker had a statistically significant effect on the likelihood of Indigenous children attending preschool. No similar study of Indigenous school teachers, tutors or AIEWs was identified, though Frigo and Adams (2002) found descriptive statistics in their study of 13 schools with Indigenous students suggesting that Indigenous staff presence was not standardised: “all schools variably employed AIEWs, Indigenous ATAS tutors (Aboriginal Tutorial Assistance Scheme) and Indigenous teachers and one had an Indigenous principal”. One school with 19 Indigenous staff had seen an increase in Indigenous enrolment, programs and events (Frigo and Adams, 2002: 12).

A quantitative study (evidence rating: iii) using a nationally representative sample of 437 American Indian and Alaskan Native children in the United States using the ‘*Early Childhood Longitudinal Study-Kindergarten*’ (ECLS-K) dataset identified an association between positive attitudes towards learning amongst American Indian and Alaskan Native students (as perceived by their teachers) and cognitive skill development (Marks and Garcia Coll, 2007: 671). In Australia, no quantitative assessment of these linkages has been attempted for Indigenous populations. However, the ‘*Australian Temperament Project*’, a longitudinal quantitative study (evidence rating: iii) that is representative of the child population of Victoria incorporated assessment from infancy (n = 2443) of the factors underpinning reading disabilities in Grade 2 of school. This study employed parent (n = 1605) and teacher (n = 1205) behavioural and reading assessments (measured using the Rutter Child Behaviour Scales and the ACER Word Knowledge Test respectively) to identify 16 per cent of children as having reading disabilities, with 76.4 per cent of boys and

47.6 per cent of girls in this group also having behavioural problems. A follow up study in Grade 4 used a sub-sample to determine that children with behaviour problems had a greater likelihood of reading disabilities in comparison to children without behavioural problems. Moreover, the study also demonstrated that “good school achievement may exert a protective effect, facilitating improved school adjustment” (Prior et al, 1995: 33, 35, 36). Therefore it is appropriate that qualitative evidence suggests that positive self-identities (Purdie et al 2000: 4) and attitudes to school amongst Indigenous students (Dockett et al, 2006: 141) aid their school success (Table 3.1). It was also found that Indigenous children develop a more positive concept of themselves as students when teachers focus on encouraging their academic achievement early on in their schooling (Purdie et al, 2000: 46). However, Frigo et al (2004) and Dockett et al (2006) found mixed qualitative evidence regarding the value that teachers place in Indigenous knowledge and skills and also the different expectations that teachers have of Indigenous and non-Indigenous students (Frigo et al, 2004: 48-9, 50; Dockett et al, 2006: 143).

The relationship between teachers and parents matters, because children’s educational opportunities are greatly enhanced when parents have confidence in the principal and teachers at their child’s school (DEST, 2005a: 40). Quantitative research (evidence rating: iii) on 197 Non-Indigenous Australian children found that transition programs with multiple opportunities for parents to familiarize themselves with the school environment have a positive association with children’s adjustment and with lower ratings of problem behaviour (Margetts, 1999: 7). It is likely that this will also be the case for Indigenous children; Indigenous parents interviewed in a study in Queensland report that it is crucial that teachers show respect and provide an open door to them. Waller (1994) also identified this as important in an appraisal of earlier programs (Waller, 1994: 4, 90).

Much has been written about strategies that will improve Indigenous school readiness. This has mostly been based on qualitative perceptions and informed opinion rather than on any evidence of impact (Table 3.1). Accordingly, authorities in Indigenous child development state the need for new research to assess the effect of culturally-appropriate learning strategies on academic achievement (SNAICC, 2004b: 10). Culturally-appropriate teaching is frequently promoted (Waller, 1994: 89; Adams, 1998: 7; Purdie et al, 2000: 36; Frigo and Adams, 2002: 3; Thorpe et al, 2005: 105; Hanlen, 2007: 237) and a key constituent in the ‘Incredible Years’ classroom social skills and problem solving child training program. This curriculum (Webster-Stratton and Reid, 2004: 105-6), has been applied in a social skills program with a total sample of 647 preschool children, including 24 Indigenous children (Homel et al, 2006: 38, 47), though it is not possible to isolate its effectiveness in Indigenous contexts from the other ethnic groups in the study. Hanlen has theorised that employing “environmental literacies [which] may be defined as the knowledge and understandings that people use to read and interpret the natural world” (Hanlen, 2007: 234) and using the outdoor environment as a teaching resource, with which Indigenous children are perceived to have a strong affinity (Waller, 1994: 89; Martin, 2007: 8), may improve the cultural-appropriateness of curricula. Other

strategies include engaging Indigenous community members in schools, culturally-appropriate professional development for Non-Indigenous teachers (Frigo et al, 2004: 53) and the training and support of additional Indigenous staff (Dockett et al, 2006: 141, 143). Until these propositions are researched using rigorous methodologies, there is no way of assessing their impact on Indigenous educational outcomes.

Ready Communities

A recent review states that “school readiness is an outcome of the resources (including knowledge and skills), attitudes (including priorities) and relationships of a community” (ARACY, 2006: 9). Kagan and Rigby (2003) suggest that ‘ready’ communities should have access to, and prioritise the use of community-based health services and state that three important attributes of ‘ready’ communities are that they provide safe, supportive and nurturing environments (Kagan and Rigby, 2003: 16). We have found no studies that identify examples of *ready* Indigenous communities and that quantify the effect of their attributes on school readiness (Table 3.1), so it is helpful to examine how closely Indigenous communities match the attributes outlined by Kagan and Rigby (2003).

To what extent are Indigenous communities safe? The Western Australian Aboriginal Child Health Survey and other secondary quantitative data (evidence rating: v) for the Northern Territory define alcohol and drug abuse as widespread (Zubrick et al, 2004: 114-20; Li et al, 2006: 25-6). Furthermore, “children’s exposure to, or ‘witnessing’ of, domestic violence (that is, violence between intimate partners) can be considered as a form of emotional abuse” (NTDHCS, 2004: 13). Domestic violence contributes to child abuse and neglect, which was highlighted as a problem in Indigenous communities (Wild and Anderson, 2007: 218). Bolger (1991) used available data (evidence rating: v) to estimate around 6000 cases of domestic violence against women in the Northern Territory each year, which constituted about one third of the Indigenous female population suffering violence each year (Bolger, 1991: 11). We identified no more recent solid evidence that could corroborate these findings or indicate whether these rates had intensified or abated and accordingly, a report (Thomison, 2004) suggests that “there would appear to be a clear need for more extensive and consistent assessment of the nature and extent of violence in Aboriginal communities” (Thomison, 2004: 58). This is particularly appropriate since perceptions held by stakeholders in Indigenous child development suggest that domestic violence continues to be a problem in Indigenous communities (SNAICC, 2004b: 10). The proportion of Indigenous children on care and protection orders may indicate the extent of the problem. This is higher than for Non-Indigenous children in New South Wales and Queensland (evidence rating: v - NSW Commission for Children and Young People and Commission for Children and Young People [Qld], 2004: 25) and in the Northern Territory in 2003-4, “Aboriginal children were 4.7 times more likely than other children to be the subject of a substantiated child protection notification” (evidence rating: v - NTDHCS, undated: 8). This evidence may imply that many Indigenous communities do not represent safe contexts where children’s school readiness is actively fostered. However, the role in councils of traditional elders appears to underpin Indigenous community safety. Thus, a qualitative action research project

(evidence rating: Q) in Ikuntji, Northern Territory established that “when problems occur, the Council takes action” and “people feel supported and cared for which helps them want to work and contribute to their community” (Fasoli et al, 2007: 120, 121).

How supportive are Indigenous communities of Indigenous child school readiness? An action research project involved exploration of notions of Aboriginal pedagogy by Indigenous educators, who determined that education should be through elders and under community control (Blitner et al, 2000). Another action research study in Gapuwiyak, Northern Territory also suggests that intervention success is favoured by community involvement in design and implementation and undermined by a “limited sense of ‘community’ and strong sense of ‘family’ and ‘individual’” (Smith et al, 2002: xi). This study sought to promote child growth (evidence rating: iv, Q) through the partial formation of a ‘Family Centre’ strategy incorporating a play group, preschool and parental education and nutritional supplementation programs (Smith et al, 2002: 22, 25). However, this study did not explore how the community attributes or research practices promote school readiness let alone identify how their success may be exported elsewhere. It is apparent to the authors that research of this nature is highly desirable. This is particularly appropriate since quantitative data (evidence rating: v) testifies to low levels of Indigenous parental education (Devitt et al, 2001: 63; Daly and Smith 2005: 52), which may reduce healthcare awareness (undermining child development) and the capacity of parents to support their children’s schooling.

Are Indigenous communities nurturing communities? Qualitative evidence suggests that Indigenous elders are perceived to express deep concern about child health and well being (FaCS, 2002) and Indigenous parents report that they value healthcare support and access (Dockett et al, 2006: 143). However, service access is linked to community size, since a critical population mass is required to make services provision viable (Fasoli et al, 2007: 10). Accordingly, Indigenous qualitative interviews and focus groups describe the inaccessibility of services, particularly in remote locations (FaCSIA, 2006: 9). Additionally, quantitative evidence (evidence rating: v) gathered in the Western Australian Aboriginal Child Health Survey suggests that nutritious food is not widely available in many Indigenous communities (Zubrick et al, 2004: 125-34). The effects of insufficient nutritional intake on Indigenous school readiness are reviewed in Section 5.

Ready Families

Any definition of *ready* Indigenous families needs to consider the importance of extended family networks for early child development, since Martin (2007) expressed the view that the nuclear family concept is inappropriate for the Indigenous context (Martin, 2007: 9). Very little evidence is available in support of this assertion. One research project, the ‘*Footprints in Time*’ longitudinal study of Indigenous children (FaCSIA, 2006) used focus groups and in-depth interviews with community elders, parents and carers, children, service providers and other stakeholders in the Torres Strait region. This study generated qualitative evidence suggesting that “children have a number of people watching over their growth and development

who help to teach them life skills, and endeavour to keep them on track” (FaCSIA, 2006: 7). It is also purported that extended families constitute a valuable source of social and cultural capital for Indigenous populations, since they link people to wide reaching networks that cushion against financial hardship through the sharing of resources (Daly and Smith, 2005: 52). Extended families are perceived to be the main source of parental awareness of available services and supports (SNAICC, 2004a: 62). This is also reputed to be the case in the Canadian Indigenous context (Barlow et al, 2006: 1101), though quite how the support of extended families contributes to the school readiness of Indigenous children has not been researched in either Canada or Australia (Table 3.1).

A key function of families in assisting the successful transition of children to school is through involvement and support of child development before and after the start of the first school term (Arnold, 2007: 3) by reading to children at home (DEST, 2005a: 40; ARACY, 2006: 7). A study (evidence rating: iii) in the United States of 493 Caucasian teenage mothers with broad socio-economic status used analysis of variance and covariance on questionnaire data to establish that low levels of maternal education had a detrimental effect on the home literacy environment of their children. Teenage mothers are less well equipped to provide effective learning contexts (Burgess, 2005: 252, 254-5). Another U.S. study (evidence rating: v, Q - Wright et al, 2000) examined the school readiness of 885 children and although the authors do not provide information on the demographic make-up of their sample, they state that 52 per cent of the children would qualify for bilingual education. Parents with low educational and socio-economic status, principals and teachers from 11 Utah schools provided qualitative responses suggesting that parents had low expectations of their children’s education and lacked the personal attributes and materials at home to support school readiness (Wright et al, 2000: 101, 107, 108, 111). Accordingly, since it has been suggested that there is a lack of positive role modelling by Indigenous parents whose own education was limited (McGarrigle and Nelson, 2006: 2-3), it is likely that cross-generational failings in the readiness of services and schools negate the capacity of Indigenous families to assist their children’s transition to school. However, we found no research that substantiates this claim by assessing the links between levels of Indigenous education across the generations (Table 3.1).

Table 3.1: Definitions of Australian Indigenous School Readiness: A Summary of the Literature

Domain of School Readiness	Type of Evidence/ Information	Key issues identified
Ready Services	None	Need for parenting classes, home visiting, structured preschool to encourage a 'school culture' and to build bridges between early childhood and school.
Ready Schools	Quantitative	Australia: Indigenous presence in preschool raises attendance rates. US: Positive attitude towards learning boosts Indigenous students' cognitive development.
	Qualitative	Success at school related to an under-defined term 'school environment'. Potential attributes may include: Indigenous children feeling welcome; Indigenous cultural presence; Indigenous staff presence; interaction between parents/guardians and school.
	Opinion	Capitalising on perceived Indigenous environmental affinity by employing environmental pedagogies.
Ready Communities	None	No studies define or identify examples of ready Indigenous communities. Research evidence illustrates attributes of Indigenous communities that appear to fit a 'global' definition of ready communities without investigating how this translates into Indigenous children's readiness for school
Ready Families	Qualitative/ Opinion	Extended families as opposed to nuclear families constitute an appropriate family construct for Indigenous contexts; although quite how extended families contribute to Indigenous school readiness has not been researched.
	Qualitative/ Opinion	Many Indigenous parents/guardians are ill-equipped to support their children's home-learning, which is purported (without evidence) to result from low inter-generational literacy rates.

4 Assessing school readiness for Australian Indigenous children

Earlier reviews of the literature have focussed on the Early Development Indexes of Canada (EDI) and Australia (AEDI) when considering the assessment of school readiness at community levels. The '*Australian Early Development Index*' (AEDI) is a teacher completed assessment of five domains of early child development: physical health; emotional maturity; language and cognitive skills; communication skills; general knowledge. In 2004-5, 25 communities from five states and territories implemented the AEDI (CCCH, 2007b: 4). The AEDI provides communities with information on child health and development "to assess how well they are doing in supporting young children and their families" (CCCH, 2007b: 4). Since the AEDI "provides data on populations of children and is interpreted ... at the level of suburb or postcode" (CCCH, 2007b: 7), it has the potential to help communities become more 'school ready'. Future research is required to assess the impact of this tool on the school readiness and academic achievement of children. The AEDI is currently being adapted to create an Indigenous Index (I-AEDI) that will be piloted during 2008-9. The reader is referred to reviews and reports (NSW Parenting Centre, 2003: 12; ARACY, 2006: 9, 10; Headline Indicators Steering Group, 2006: 31, 35) and the Consultation paper and Workshop report associated with this document, where the AEDI and the forthcoming I-AEDI are discussed at greater length.

Developmental screening of individual children provides assessment of anthropometric indices (e.g. weight to height ratio), vision and hearing, gross motor, language and socio-emotional competencies (Meisels, 1988: 95). CCCH (2007) report that Australia lacks a systematic national approach to detection of emerging

problems amongst children aged between 18 months and three years, a crucial period of a child's development. The report states that such a strategy may be undermined by geographical unevenness of service distribution (especially in remote Australia, where Indigenous children predominate) and due to variation in staff ability to reliably administer such a tool and interpret results (which may be more problematic for Indigenous children). Additionally, an overseas model suited to implementation or adaptation in the Australian context is lacking (CCCH, 2007: 8, 13, 19). Currently, a variety of developmental screening tools are in use (CCCH, 2007: 20). These tools are outlined in Table 4.1. One tool, the Victorian 'Parent Evaluation of Development Status' questionnaire (PEDS) facilitates the detection of developmental delays that are likely to influence school readiness and transition and has been reviewed previously (ARACY, 2006: 9). The current review has not identified any studies assessing the applicability of standardised development screening measures for Indigenous Australian children aged 18 months to three years or any evidence either for or against the suitability of parental questionnaires to Indigenous child rearing styles within extended family contexts.

School readiness tests define school entry characteristics and assess curriculum-based skills and are a prerequisite for specific instructional programs as well as aiding curriculum design (Meisels, 1988: 95). In a review regarding Indigenous assessment, Freebody (2007) states that literacy and assessment are intrinsically linked, since different kinds of assessments measure different kinds of literacies (Freebody et al, 2007: 11). However, research has uncovered qualitative evidence of teachers referring to students' home language skills as "bad or poor English" (Clancy and Simpson, 2002: 59; Frigo et al, 2004: 53). Therefore, it is unlikely that assessment in Australian Standard English leads to accurate appraisal of the school readiness or academic achievement equally for Non-Indigenous and Indigenous students, or across the Indigenous population. Moreover, reviewing United States school readiness assessment results, Rock and Stenner (2005) determined that different tests resulted in different gaps in the prediction of school readiness between ethnic groups. The 'Peabody Picture Vocabulary Test-Revised' resulted in a larger gap in black-white prediction of school readiness and lower accuracy across sample populations compared to other tests (Rock and Stenner, 2005: 19). Although no single cause for this ethnic gap in prediction was identified, the authors suggest four ways that this can occur: systematic bias, where ethnic groups are not equally proficient in the vocabulary tested; construct bias, where the items tested are not equally familiar to all ethnic groups; prediction bias, where longitudinal development in children differs and tests are not suitably designed to accommodate this increasing divergence; and the broader social context within which tests are delivered disadvantages some ethnic groups (even if tests are not ethnically biased) (Rock and Stenner, 2005: 28-9). This problem is recognised by the National Association of Early Childhood Specialists (NAEYC) who state:

"Assessors of young children have few, and sometimes no, appropriate assessments to choose from in assessing young English-language learners. Appropriate assessments—that is, assessments that are psychometrically, linguistically, culturally, and developmentally appropriate—are urgently needed in each of the hundreds of languages represented in early education settings in the U.S." (NAEYC, 2005: 39).

Table 4.1: Developmental Screening Tools available for use in Australia

DOMAIN	Area	Current approach
Physical health:	Weight	Included in many parent held child records Still debate about the utility of calculating a BMI on all children (rather than those where there is a concern)
	General health (especially asthma, allergy)	Only in surveys
Language and cognition:	Expressive language	PEDS, ASQ*, Brigance
	Receptive language	PEDS, ASQ*, Brigance
	Speech	PEDS, ASQ*, Brigance
	Communication	ASQ*, Brigance
	Global development	PEDS, ASQ*, Brigance
Behaviour:	Sleep	Victoria asking standard sleep question in revised maternal/family and child health framework (8 month visit)
	Internalising	SDQ (Goodman)
	Externalising	SDQ (Goodman)
Social and emotional function:	Social and emotional function	Strengths and Difficulties Questionnaire (Goodman, 2001) - currently in child health surveys (Victoria, NSW, WA) and national CAMHS (The Child and Adult Mental Health Service)
Family/environment:	Parent engagement	No tool or measure identified. A noted area of concern (i.e. promoting parent attachment) in the Victorian revised maternal/family and child health service framework)
	Learning & literacy environment	No tool or measure identified (Victoria including literacy promotion in revised maternal/family and child health service framework)

Source: Externally adapted from CCCH (2007: 29 – Table 4)

* ASQ: 'Ages and Stages Questionnaire'

The document 'Screening and Assessment of Young English language Learners' defines guidelines for the effective assessment of young English language learners whose home language is not English (NAEYC, 2005). Key principles are outlined in Figure 4.1. This review has not identified any similar set of assessment guidelines for the Australian context, although the lack of appropriate assessment strategies is equally evident from the diversity of the tools employed in studies (reviewed later in this section). The literature on Australian Indigenous assessment discusses some similar concerns to those raised in Figure 4.1. It is recommended that assessment tools for Indigenous school readiness take a dual-language approach wherever possible (Freebody et al, 2007: 15) and collaboration with Indigenous researchers in design and application of assessment tools is valued. It is also recognised that there are cultural concerns and skills-deficiency issues with participation of Indigenous parents and Non-Indigenous teachers in assessment (Purdie, 2000: 36; Marks et al, 2003: 19; Frigo et al, 2004: 6, 7, 19, 37, 53).

1. APPROPRIATE USES OF SCREENING AND ASSESSMENT

- 1a. Young English-language learners should be regularly screened, screening tools should be linguistically and culturally appropriate, and screenings should be followed up in appropriate ways.
- 1b. Young English-language learners should be assessed in order to monitor and guide learning in language development and other areas, and to identify disabilities.
- 1c. Young English-language learners should be included in program evaluation assessment procedures, but the assessment procedures and instruments must be appropriate.

2. CHARACTERISTICS OF APPROPRIATE ASSESSMENTS FOR YOUNG ENGLISH-LANGUAGE LEARNERS

- 2a. Assessments for young English-language learners are ongoing.
- 2b. Assessments for young English-language learners are based on multiple methods and measures.
- 2c. Assessments for young English-language learners involve multiple people.
- 2d. Assessments for young English-language learners are age appropriate.
- 2e. Assessments for young English-language learners are rarely standardized.

3. LINGUISTIC AND CULTURAL APPROPRIATENESS

- 3a. All screenings and assessments used with young English-language learners must be linguistically appropriate.
- 3b. All assessments used with young English-language learners must be culturally appropriate.
- 3c. Translations of English-language instruments should be free of linguistic and cultural bias before being used with young English-language learners.

4. CHARACTERISTICS OF ASSESSORS

- 4a. Assessors most often are teachers, but paraprofessionals, assessment assistants, and specialized consultants also play an important role.
- 4b. Assessors should be bilingual and culturally aware.
- 4c. Assessors should know the child.
- 4d. Assessors should be knowledgeable about second-language acquisition.
- 4e. Assessors should be trained in and knowledgeable about assessing young English-language learners.

5. THE ROLE OF FAMILY IN THE ASSESSMENT OF YOUNG ENGLISH-LANGUAGE LEARNERS

- 5a. Family members are essential sources of information in conducting and interpreting assessments.
- 5b. Programs refrain from using family members to conduct formal assessments, interpret during formal assessments, or draw assessment conclusions.

6. NEEDS IN THE FIELD

- 6a. Scholars should continue their work to expand research and theory about second language acquisition and the development of young English-language learners.
- 6b. More and better assessments are urgently needed.
- 6c. Policymakers, institutions of higher education, and programs should continue to diversify the early childhood workforce, with a focus on increasing the number of bilingual early childhood professionals.
- 6d. Early childhood professionals need opportunities for professional development in the assessment of young English-language learners.

Figure 4.1: NAEYC Recommendations on screening and assessment of young English-language learners.

Source: NAEYC (2005: 8)

As for specific assessments of Australian Indigenous school readiness, few studies have assessed Indigenous children independently from Non-Indigenous children. Only one study was identified that assessed Indigenous children independently and used tools specifically validated to assess Indigenous children (Table 4.2), this was a behavioural intervention called ‘Exploring Together’ (Robinson and Tyler, 2003). This study originally employed the ‘Achenbach Child Behaviour Checklist’ and the ‘Parenting Scale’ and adapted them for application in the Tiwi Islands through a process including consultation with the community. These tests were also validated amongst Tiwi children. Behavioural inventories developed include: a checklist for teachers and parents to assess problem behaviour in children; a child-completed questionnaire to detect levels of anxiety, withdrawnness, aggression and self esteem; a parental questionnaire to indicate levels of anxiety and stress, and parenting styles in response to child behaviour. A pre- and post- study of ‘Exploring Together’ assessed child behaviour problems (evidence rating: iii) and found a statistically significant

reduction in the problem behaviours among the sample of 57 Indigenous children (Robinson and Tyler, 2003: 10). This study demonstrates both the validity of the tools and success of the intervention. Measurement tools have subsequently been adapted for application in Darwin, although outcomes have yet to be released.

Three studies were identified that assessed Indigenous children independently, but did not employ assessment tools validated for Indigenous children (Table 4.2). The ACER 'Longitudinal English Literacy and Numeracy Survey' (LLANS) has been applied to a cohort of 152 Indigenous students in Years One and Three of school (Frigo et al, 2004: 5, 30). The test (evidence rating: iii) enabled longitudinal mapping of child development and comparison of Indigenous LLANS students against a Non-Indigenous LLANS sample. A team of Indigenous researchers conducted the fieldwork for Indigenous children (Frigo et al, 2004: 5, 7, 20, 38). Since some LLANS tasks call for independent reading, it was not possible for all Indigenous students to complete every component of the test. However, this was considered not to "affect the validity of comparisons between the Indigenous sample and the main LLANS sample". LLANS assessment tasks are considered to be consistent with good assessment practice for Indigenous students and since three students who spoke an Indigenous language and one who only spoke Aboriginal English were amongst 11 Indigenous LLANS 'high achievers', LLANS may have the potential to be a culturally appropriate assessment device.

In their qualitative study of the effect of self-identity on Indigenous students' educational outcomes (Purdie et al, 2000), scales designed to measure ethnic identity (the 'Self Description Questionnaire', the 'Coopersmith Self-Esteem Inventory', the 'Rosenberg Self-Esteem Scale', the 'Piers-Harris Self-Concept Scale' and the 'Song and Hattie Self-Concept Scale') were used to construct a simplified version of a self-concept instrument entitled 'How I Feel About Me'. This tool includes components assessing 'general liking of self', 'sense of personal efficacy' and 'self-constructs of family and school'. The authors did not rigorously assess the validity of 'How I Feel About Me' for the Australian Indigenous context, though they report that it may provide a "modicum of insight" as it is constituted of components that have been applied in diverse cultural contexts. Accordingly the tool was applied in both Indigenous (n = 194) and Non-Indigenous groups (n = 43) (Purdie, 2000: 35). This was used to "challenge the popular view that Indigenous students have lower self-concepts than Non-Indigenous students". However, Purdie et al (2000) stress the "need for a specific instrument to be developed for Indigenous Australians, and this should be done in consultation with Indigenous researchers" (Purdie et al, 2000: 32, 33, 35, 36).

The '100 Children go to School' study (Hill et al, 1998; 2002) assessed literacy precursors using materials that were expected to be familiar from children's homes, including items based on photographs of familiar food items, toys, retail signs and a 'junk mail' Christmas toy catalogue. Tasks more closely related to school conceptions of literacy employed 'Concepts About Print', 'Writing Observation', the 'Sight Word Test',

‘Letter Identification’, ‘Phonemic Segmentation’, ‘Reading Behaviours on Text Gradients’, the ‘School Entry Assessment’, and ‘First Steps’. This pre- and post- study (evidence rating: iii) included only four Indigenous children. However, the research group gave considerable thought to the cultural suitability of tests (Hill and Loudon, 1999: 13-8). With regard to the English literacy acquisition of Indigenous and ethnic minority students, the researchers suggest:

“Teachers and researchers need to learn more about how children live in homes and communities. We don’t know enough about the complexity of networks which support families with minimal economic resources, their sophisticated multilingual and / multi-modal language use and production.”

(Hill and Loudon, 1999: 18)

The Queensland Early Childhood Consortium did not assess Indigenous children independently. This study investigated how learning experiences and teaching practices prior to Year One can successfully and cost-effectively support child preparation for formal schooling (evidence rating: iii). ‘Preparatory Year’ trials were carried out in 39 Queensland schools in 2003-4 (Thorpe et al, 2005: 23). The study aimed to examine the effects of ‘Prep’ on the socio-emotional, communication, literacy, numeracy and motor development of 1831 children, approximately six per cent of whom were Indigenous (Thorpe et al, 2005: 2, 3, 41, Figure 2.4). Assessment of speaking, listening and reading employed the ‘Developing Communication’ assessment tool, which used indicators listed in the ‘Bandscales for Aboriginal and Torres Strait Islander Learners for Junior Primary’ (Education Queensland, 2001). The cognitive processes that underlie early literacy and numeracy skills were assessed using the ACER ‘Who Am I?’ tool that was subsequently used in the Longitudinal Study of Australian Children (LSAC). Otherwise, standard child assessment tests were employed. For example socio-emotional behaviour was assessed with ‘Settling into School’, which was based on the ‘Teacher Rating Scale of School Adjustment’ developed in Illinois (Birch and Ladd, 1997; Thorpe et al, 2005: 211). The study determined that the poorest performers included Indigenous children, though it is not possible from the report to identify the suitability of tests to Indigenous characteristics (Thorpe et al, 2005: 10).

The studies included in this section of the review illustrate that there is a pressing requirement for research on the assessment of Indigenous children’s school readiness and the design and validation of Indigenous specific assessment tools. There are some promising signs that Indigenous-specific assessment tools are in the process of development. It is reported that ‘Prep’ was trialled in Queensland’s Torres Strait Islands (although no documented assessment has been identified) and was proposed for roll-out across Cape York in 2007. A new diagnostic tool developed to assess the learning needs of Indigenous students starting school, longitudinal assessment of individual and group growth and identification of students requiring additional support in literacy and numeracy are incorporated (DEA, 2005: 7-9). The Cape York Institute (2007) has called for similar assessment strategies to be applied across the first three years of schooling (Cape York Institute, 2007: 20-1).

Table 4.2: Summary of Studies Assessing Components of Indigenous School Readiness

Study	Indigenous/ Non-Indigenous Children Assessed	Assessment Tools	Assess Indigenous Children Independently	Specifically Designed to assess Indigenous Children	Validated Assessment Tool for Indigenous Children
'Exploring Together' (Robinson and Tyler, 2003)	Indigenous n = 57	Adapted versions of: 'Achenbach Child Behaviour Checklist', The 'Parenting Scale'.	✓	✓	✓
'Longitudinal English Literacy and Numeracy Survey' (Frigo et al, 2004)	Indigenous n = 152 Non-Indigenous n = > 1000	English Literacy and Numeracy Skills Development	✓	✗	✗
'Positive Self-Identity for Indigenous Students and its Relationship to School Outcomes' (Purdie et al, 2000)	Indigenous n = 194 Non-Indigenous n = 43	'How I Feel About Me'	✓	✗	✗
'100 Children go to School' (Hill et al, 1998; 2002; Hill and Loudon, 1999: 13-8)	Indigenous n = 4 Non-Indigenous n = 96	Literacy precursors: items based on photographs of familiar food items, toys, retail signs and a 'junk mail' Christmas toy catalogue. School conceptions of literacy: 'Concepts About Print', 'Writing Observation', the 'Sight Word Test', 'Letter Identification', 'Phonemic Segmentation', 'Reading Behaviours on Text Gradients', the 'School Entry Assessment', and 'First Steps'.	✓	✗ ✗	✗ ✗
'Preparing for School' (Thorpe et al, 2005)	Total n = 1836 Indigenous ~ 6%	Speaking, listening and reading: 'Developing Communication'; Socio-emotional behaviour: 'Settling into School'; Cognitive processes (literacy precursors): 'Who am I?'; Receptive vocabulary, listening comprehension: 'Looking at Pictures'. 'Early Number Understanding'; Motor development: 'Settling Into School'; 'The Short Temperament Scale for Children' (STSC).	✗	✓ ✗ ✗ ✗ ✗ ✗ ✗	NOT SPECIFIED ✗ ✗ ✗ ✗ ✗ ✗

5 Risk and protective factors for the school readiness of Australian Indigenous children

Huffman et al (2001) suggest that “by definition, identified risk factors for difficult transition into school are variables that predict early school failure, and may be causally related to the onset or continuation of emotional, social and academic difficulties in school” (Huffman et al, 2005: 5). Luthar (1993) suggests that attributes with direct ameliorative effects – operating on both low and high-risk conditions – should be labelled ‘protective’ of children’s school readiness (Huffman et al, 2005: 7).

This review of literature on the risks and protective factors that influence Australian Indigenous early child development and school readiness examines 70 studies. Tables 5.1 and 5.2 outline research on risk and protective factors for Indigenous school readiness. Assessment of the literature is organised in terms of the ecological domains of school readiness, with the addition of risk and protective factors at individual child level. This is also in keeping with other research on risk and protective factors (Huffman et al, 2001). Thus, research is categorised into thematic areas that operate at individual, parental, family, community and service delivery levels and are likely to impact on child development either in-utero until age 3 or after age three until age eight (Year 3 of school). Table 5.2 outlines research on protective factors for Indigenous school readiness. As in Table 5.1, protective factor research is categorised into thematic areas that operate at individual, parental, family, community and service delivery levels. In contrast to Table 5.1, protective factor research is categorised in terms of the impact on child development in-utero until age three, age three until age five and age five until age eight (Year 3 of school).

The studies in Tables 5.1 and 5.2 include seven clinical trials of interventions that map directly onto readiness for school and meet the criteria for the National Health and Medical Research Council rating scale: A systematic review of primary healthcare interventions on Otitis Media (Couzos et al, 2001) and a trial of ototopical agents on the hearing and school attendance of Indigenous children with Chronic Suppurative Otitis Media (COSM) (NACCHO, 2003); a randomised controlled trial (RCT) of nurse led home visiting (Armstrong, 1999); a case series examining environmental health (Pholeros et al, 1993); a series of RCTs examining Iodine-supplementation in Papua New Guinea (Pharaoh et al, 1971; Connolly et al, 1979; Connolly and Pharaoh, 1989). Comparative studies incorporated in the review examine sustainable antenatal care services (Panaretto et al, 2007), low birth weight (Blair et al, 1994), paediatric outreach services (Rothstein, 2007), Otitis Media and linguistic incompetence (Lewis, 1976) and Otitis Media and swimming pools (Lehmann et al, 2003). The majority of studies do not merit rating on the adapted NHMRC evidence classification scale employed here (Table 2.1). These include 34 studies that apply descriptive statistical methods to census material or other population surveys, 11 studies that employ qualitative techniques or ethnographies and a regional socio-economic case study (Taylor, 2002). The final grouping consists of theoretical work on Indigenous childrearing practices (Waltja Tjutangku Palyapayi Aboriginal Corporation, 2001), literacy learning and schooling (Buckskin 2001; Clancy and Simpson, 2002; Hanlen, 2007).

Biddle's (2007) study using multivariate analysis on 2001 census data is the first of its kind to examine the socio-economic factors that are associated with Indigenous preschool attendance. Although synopses of risk and protective factors appear in reviews and reports on Indigenous disadvantage in child development (Congress, 2004: 15-17; SCRGSP, 2005; Penman, 2006), this review has not unearthed any comprehensive analysis of risk and protective factors that influence Indigenous school readiness. In the absence of such a study, the frequency of citations or research on risk and protective factors has been calculated using the data in Tables 5.1 and 5.2 to provide an indication of the research community's perception of the relative importance of different factors. The most commonly researched risk and protective factors that influence an Indigenous child's developmental domains of physical health, socio-emotional development/ mental health and literacy and cognitive development have been identified and are the focus of this section of the review. Factors that were discussed in detail in preceding sections are identified, though to avoid repetition, their effects are not reiterated. Literature examining risk and protective factors in other contexts is used where necessary to provide supporting evidence and enhance the scope of the review (Tables 5.1 and 5.2).

Key risk and protective factors for the Australian Indigenous Child

Overall, Tables 5.1 and 5.2 demonstrate the poverty of high-level evidence and that studies classified as iv, v and Q on the adapted evidence scale predominate. Low birth weight is a risk factor with a long reaching impact on school readiness, transition and academic achievement (Huffman et al, 2001: 10; Irwin et al, 2005: 11). In a study by Bowen et al (2002), (evidence rating: iii) the academic achievement of 61 non-disabled children with a birth weight less than 1000 grams or gestational period less than 28 weeks was compared with control group children at age eight. It was found that non-disabled extremely premature children had lower scores on standardized measures of academic achievement and were more likely to be reported by teachers as falling below grade level in reading (48% vs 13%; $P < 0.001$), mathematics (48% vs 10%; $P < 0.001$) and spelling (48% vs 17%; $P < 0.002$), and to require special education support (25% vs 4%; $P = 0.004$) (Bowen et al, 2002: 440-2). Australian Institute of Health and Welfare (2003) data identified Indigenous Australian babies as twice as likely to have low birth weight as Non-Indigenous Australian babies (Daly and Smith, 2005: 52). The variation in Indigenous birth weights by maternal attributes and behaviour and by geographical context are examined later in this section.

Table 5.1: A Schema of Risk Factors for Indigenous Australian School Readiness

		Risk				
		Child	Parental	Factor	Scales	
				Family	Community	
					Education and health services	
Early child development and growth (prenatal to age 3)		<p>Rates of hospital admission for infectious diseases (v: Zubrick et al, 2004: 180, Table 2.13; iii: Rothstein et al, 2007: 520; v: Li et al, 2006: 60-5)</p> <p>Low birth weight (iii: Blair et al, 1994; iii: Bowen et al, 2002; ii-3: Graham et al, 2007; v: d’Espaignet et al, 1999: 26; v: NT Perinatal Information Management Group, 2002: 32; v: AIHW, 2000; v: Leeds et al, 2007; v: Singh & Hoy, 2003; v: Zubrick et al, 2004: 107; v: Reichman, 2005: 97-99; v: Daly & Smith, 2005: 51; v: Stewart and Li, 2005: 39; v: Li et al, 2006: 24)</p> <p>Dietary Deficiencies (ii: Pharaoh et al, 1971; ii: Connelly et al, 1979; ii: Connelly & Pharaoh, 1979; v: Casey & Evans, 1993: 6; v: NACCHO, 2003; Q: SNAICC, 2004b: 10; v: Zubrick et al, 2004: 125-34; v: Currie, 2005: 125-6; Q: FaCSIA, 2006: 9; v: Li et al, 2006: 30, 33 ; iii: Rothstein et al, 2007: 520)</p> <p>Hearing impediments (iii: Lewis, 1976; v: Casey & Evans, 1993: 6; i: Couzos, Metcalf & Murray, 2001; v: Zubrick et al, 2004: 142-150; v: Currie, 2005: 121-2; v: Li et al, 2006: 55; iii: Lehmann et al, 2003; ii: NACCHO, 2003)</p> <p>Poor Oral Health (v: Li et al, 2006: 57; v: Morris et al, 2005)</p>	<p>Alcohol and tobacco consumption (ii-3: Graham et al, 2007; v: AIHW, 2000; Q: Choo, 1990; v: Casey & Evans, 1993: 5; v: Denton and Germino-Hausken, 2000; v: Fitzgerald, 2001; v: Evans & Kantrovitz, 2002: 306-7; ii: Olds, 2002: 163; v: ABS, 2003; v: DHA, 2003; v: Zubrick, 2004: 114-20; v: Reichman, 2005: 102; Q: FaCSIA, 2006: 10; v: Leeds et al, 2007; ; v: Li et al, 2006: 25-6)</p> <p>Drug and other substance use (v: Casey & Evans, 1993: 5; Q: FaCS, 2002: 13; Q: Smith et al, 2002: 3; v: ABS, 2003; v: Zubrick, 2004: 114-20; Q: FaCSIA, 2006: 10)</p> <p>Single parent (iv: Entwisle & Alexander, 1998: 356-7; v: Zubrick et al, 2004; v: Daly & Smith, 2005: 42)</p> <p>Teenage parenthood (v: ABS, 2003; v: Leeds et al, 2007; v: Zubrick et al 2004: 110; v: Li et al, 2006: 23; ii: Barlow et al, 2006: 1101; iii: Burgess, 2005)</p> <p>Child abuse and neglect (v: AIHW, 1997: 26; i: Geeraert et al, 2004: 277; v: Li et al, 2006: 47; v: Wild & Anderson, 2007: 218)</p>	<p>Selective targeting of high-risk families can stigmatize and alienate (Q: SNAICC, 2004a: 13)</p> <p>Long term unemployment (Q: Choo, 1990; Q: Smith et al, 2002: 3; v: ABS, 2003; v: ABS, 2004; v: Daly & Smith, 2005: 46, 48,49; v: AIHW, 2005; v: Hunter, 2005: 5; iv: McGarrigle & Nelson, 2006: 2; v: Li et al, 2006: 16)</p>	<p>Remoteness reduces access to nutritious food (Q: Choo, 1990; v: ABS, 2003; Q: FaCSIA, 2006: 9; v: Li et al, 2006: 30)</p> <p>Time-absorbing Socio-cultural obligations – funerals (Q: Smith et al, 2002: 4)</p>	<p>Remoteness reduces access to health, education and social services (v: Griffith, 1999; v, Q: NTDE, 1999: 95; v: AIHW 2001; v: Bailie et al, 2002; v: ABS, 2003; v: Zubrick et al, 2004; v: Daly & Smith, 2005: 49; Q: FaCSIA, 2006: 9; iv: McGarrigle & Nelson, 2006: 3; Biddle, 2007: 13)</p> <p>Rates of diseases associated with poor environmental health (iv: Pholeros, Rainow & Torzillo, 1993)</p> <p>Access to clean water and functional sewerage (Q: Choo, 1990; v, Q: Hunter, 1999: 11; ABS, 2002; v: Evans and Kantrowitz, 2002: 320; v: ABS, 2004)</p> <p>Overcrowding in housing (v, Q: Hunter 1999: 11; iv: Pholeros, Rainow & Torzillo, 1993; T: Taylor, 2004; v: Reichman, 2005: 103; v: Li et al, 2006: 20)</p> <p>Remoteness raises welfare dependency (Q: Smith, 2000; v: Daly & Smith, 2005: 45-6)</p>
	School engagement And performance (preschool to year 3)	Social and Emotional Development / Mental health	<p>Mental health disorders (T: Perry, 1995: 273; iv: Ladd et al, 1997; T: iv: Bor et al, 2001: 4; ii: Webster-Stratton et al, 2001; T: Webster-Stratton & Reid, 2004)</p>	<p>Mental health disorders (iv: Burchinal et al, 2006: 83)</p> <p>Hostile parenting and negative maternal attitudes (iv: Webster-Stratton & Hammond, 1997; iv: Bor et al, 2003: 751)</p>	<p>Children on care and protection orders (v: AIHW, 2003; v: NSW Commission for Children and Young People & Commission for Children and Young People [Qld], 2004: 25; v: NTDHCS, undated: 8)</p> <p>Domestic violence (v: Bolger, 1991; v: Fitzgerald, 2001: 142; Q: SNAICC, 2004b: 10; v: Daly & Smith, 2005: 52)</p> <p>Mobility undermines access to local pre-school / home visiting services (Q: Walker 2004: 39, 56; Q: Aslam and Kemp, 2005: 33, 69)</p>	
Literacy and Cognitive Development		<p>Preschool and school attendance (iv: Entwisle & Alexander, 1998: 359-60; Q: Rimm-Kaufman et al, 2000: 161; Q: Walker, 2004: 54)</p>	<p>Low educational status (v, Q: NTDE, 1999; v: Denton and Germino-Hausken, 2000; T: Buckskin, 2001; T: Clancy and Simpson, 2002; v: ABS, 2003; v: Thomson et al, 2004; v: AIHW, 2005; v: Daly & Smith, 2005: 52; T: Karoly et al, 2005: xv, 124; iv: Burchinal et al, 2006: 80, 82; iv: McGarrigle & Nelson, 2006: 2)</p> <p>Ill-equipped to support child’s schooling (iii: Burgess, 2005; T: Adams, 1998; v, Q: NTDE, 1999: 96; Q: Wright et al, 2000: 108; T: Hanlen, 2007: 237; iv: McGarrigle & Nelson, 2006: 2-3; Biddle, 2007: 13)</p>	<p>Lack of play materials, stimulation and poor organisation in the home environment (v: Bradley et al, 1989: 219, 233)</p>	<p>Low educational status (v, Q: NTDE, 1999; Q: Smith et al, 2002: 3; v: Daly & Smith, 2005: 52)</p>	<p>Home-school cultural and language inconsistencies (T: Gee, 1996: 88-89; iv: Margetts, 1999: 7; v, Q: NTDE, 1999: 96; Q: Rimm-Kaufman et al, 2000: 161; Q: Simpson and Clancy, 2000: 2; Q, T: Clancy et al 2001: 60; Q: Walker, 2004: 55)</p> <p>Home-school cultural and language inconsistencies increase markedly with remoteness (v: ABS, 2003)</p>

Notes:

Evidence rating scale (adapted from the NHMRC rating scale):

i: evidence obtained from a systematic review of all relevant randomised controlled trials (RCTs)

ii: evidence obtained from at least one properly designed RCT

iii: evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time-series without a parallel control group

iv: evidence obtained from case series, either post-test or pre-test and post-test

v: evidence obtained from census material or other quantitative survey of population characteristics

Q: evidence obtained from qualitative interviews, focus groups or ethnographies

T: Hypothesis, conjecture or opinion not supported by specific research findings

Reference Font:-

(Name, Year: Page Nos): Research evidence

Underlining:-

(Name: Year: Page Nos): Indigenous Australian reference

(Name, Year: Page Nos): Other reference

Table 5.2: A Schema of Protective/ Resilience Factors for Indigenous Australian School Readiness

Scale of protective or resilience factor		Child's Age		
		Antenatal – 3 years	3 years - 5 years	5 years - 8 years
	Child	Brain hard-wiring (T: Perry, 1995: 275-6, 283 ; iv: Ladd et al, 1999)	Individual autonomy and Resilience (v: Brady, 1991 ; T: Burns, 1996: 100 ; T: Waltja Tjutangku Palyapayi Aboriginal Corporation, 2001 ; Q, T: Clancy et al, 2001: 60) Attendance of high-quality pre-school disproportionately aids disadvantaged (indigenous) children (iv: Entwisle & Alexander, 1998: 359-60 ; v, Q: NTDE, 1999 ; v: Q: McRae et al, 2000: 48 ; T: Sylva et al, 2003 ; v: DEST, 2005a: 39 ; Schweinhart, 2006; Magnuson et al 2007: 146)	Child mobility (v: Daly & Smith, 1999 ; iv: Smith, 2000: 29, 35, 79) Resilient children seek role models (v: Brady, 1991) Social skills and self-confidence (Q: Lockwood & Fleet, 1999: 19 ; iii: Cooper et al, 2001 ; T: Webster-Stratton & Reid, 2004)
	Parental	Adjustment to place value in parental role (iv: Duggan et al, 1999: 82) Secure attachment to mother or other stable carer (v: Casey & Evans, 1993: 8 ; ii: Armstrong et al, 1999: 243 ; i: Bakermans–Kranenburg et al, 2003: 208)	Conversing with and reading aloud to children (v: Casey & Evans, 1993: 8 ; iv, Q: Baker et al, 1999: 118-9 ; Q: Wright et al, 2000: 115-6 ; i: Brooks-Gunn & Markman, 2005: 143 ; v: DEST, 2005a: 40 ; iii: Thomas, 2006: 10) Maternal education qualifications iv: Wylie, 2004: 19	
	Family	Clean, healthy, safe and stimulating home environment (v: Bradley et al, 1989: 219, 221)	Extended family rights and responsibilities (v: Daly & Smith, 1999 ; T: Waltja Tjutangku Palyapayi Aboriginal Corporation, 2001 ; v: Daly & Smith, 2005: 52 ; ii: Barlow et al, 2006: 1101 ; Q: FaCSIA, 2006: 7) Social Capital or collective efficacy (T: Putnam, 2000 ; T: Newton, 1997: 579 ; Q: Smith et al, 2002 ; v: Daly & Smith, 2005: 53)	
	Community	Employment schemes and welfare provision to remote communities (v: Altman & Sanders, 1995 ; v: Hunter, 2002a, 2002b ; v: Altman et al, 2004 ; v: Daly & Smith, 2005: 54)	Community involvement in program design and implementation (T: Comer, 1988, 1993 ; iv: Finn-Stevenson & Stern, 1997: 55 ; Q: Smith et al, 2002: 7-10, 25, 27 ; ii: Olds, 2002: 169)	Torres Strait children are assigned a mentor (<i>Penman, 2006: 39</i>) Friendship attributes: validation and aid (Q: Ladd et al, 1996: 1116)
	Education and health services	Antenatal screening, parent and home visiting programs are effective in increasing peri-natal outcomes, maternal sensitivity and toddler behaviour (i: Bakermans–Kranenburg et al, 2003: 208-211 ; ii: Fergusson et al, 2005: 807 ; ii: Barlow et al, 2006: 14 ; iii: Panaretto et al, 2007) Centre-based parental programs are more effective than home visiting (i: Brooks-Gunn & Markman, 2005: 153) Integrated health and education service approach (v, Q: NTDE, 1999: 11 ; Q: Ball, 2003: 7 ; Q: SNAICC, 2004a: 60-2 ; Q: Walker, 2004: 57) Transport enabling access to health and parenting services (Q: SNAICC, 2004a: 13) Community involvement in home-visiting program design and implementation (ii: Olds, 2002: 169) Well-trained home-visiting staff (ii: Olds, 2002: 169) Culturally sensitive and strengths-enhancing parenting programs with Indigenous staff and/or culturally-sensitised Non-Indigenous staff (Q: SNAICC, 2004a: 12, 13)	Transport enabling access to education services (Q: Walker 2004: 39, 57) Parental/ child training for child's disruptive behaviour prevention (iv: Fisher et al, 2000: 1362 ; iv: Bor et al, 2001: 5 ; ii: Webster-Stratton et al, 2001 ; iii: Cooper et al, 2001 ; T: Webster-Stratton & Reid, 2004) Intervention programs improve parent functioning and reduce child abuse and neglect (i: Geeraert et al, 2004: 286 ; i: Brooks-Gunn & Markman, 2005: 153) Swimming pools alleviate hearing impediments (iii: Lehmann et al 2003)	Teachers aware and respectful of students' context (iv: Frigo et al, 2004: 59-60 ; T: Hanlen, 2007: 239) Experienced Teachers (iv: Leigh, 2006: 11) Bi-lingual pedagogies designed around students' culture and interests (v: Q: McRae et al, 2000 ; iv: Frigo & Adams, 2002: 12 ; T: Webster-Stratton & Reid, 2004: 105-6 ; iv: McGarrigle & Nelson, 2006: 3 ; T: Hanlen, 2007: 237 ; v: Windisch et al, 2003) Indigenous teaching staff (Q: Rimm-Kaufman et al, 2000: 161 ; iv: Frigo & Adams, 2002: 13 ; iv: Frigo et al, 2004: 60 ; Q: Walker, 2004: 57 ; Biddle, 2007: 13) Child, parents and educator communication channels (T: Comer, 1988, 1993 ; iv: Toomey, 1989: 294 ; T: Webster-Stratton, 1999: 106 ; Q, T: Clancy et al, 2001: 58, 61 ; v: DEST, 2002 ; iv: Frigo & Adams, 2002: 14 ; iv: Frigo et al, 2004: 59-61 ; v: DEST, 2005a: 40 ; T: Hanlen, 2007: 237)

Notes:
Evidence rating scale (adapted from the NHMRC rating scale):
i: evidence obtained from a systematic review of all relevant randomised controlled trials (RCTs)
ii: evidence obtained from at least one properly designed RCT
iii: evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time-series without a parallel control group

iv: evidence obtained from case series, either post-test or pre-test and post-test
v: evidence obtained from census material or other quantitative survey of population characteristics
Q: evidence obtained from qualitative interviews, focus groups or ethnographies
T: Hypothesis, conjecture or opinion not supported by specific research findings

Reference Font:-
(Name, Year: Page Nos): Research evidence

Underlining:-
(Name: Year: Page Nos): Indigenous Australian reference
(Name, Year: Page Nos): Other reference

Another risk factor recognised as important for school readiness is dietary deficiencies in early childhood (Huffman et al, 2001: 11). The Western Australia Aboriginal Child Health Survey (evidence rating: v) determined that “compared with the NHMRC recommendations for children, the majority of Aboriginal children are not consuming sufficient fresh vegetables” (Zubrick et al, 2004: 133). Paediatric assessment of 3562 children (62 per cent of whom were Indigenous) by Rothstein et al (2007) in far north Queensland (evidence rating: iii) identified 7.8 per cent of children as ‘failure to thrive’ cases in need of nutritional supplementation (Rothstein et al, 2007: 519-20). In the Northern Territory, Department of Health and Community Services data for 2004 (evidence rating: v) illustrates a marked disparity in child undernutrition between Indigenous (n = 1164) and Non-Indigenous (n = 299) children across three measures: under-weight (lighter than expected for age); stunting (shortness- a measure of slowing in skeletal growth, indicative of chronic undernutrition); wasting (thinness – a result of inadequate food intake). The proportions of remote Indigenous children who were underweight (14.5 per cent) and exhibited stunting (11.3 per cent) and wasting (9.0 per cent), exceeded the equivalent values for urban dwelling Indigenous children by 10.9, 10.0 and 4.9 per cent respectively (Li et al, 2006: 30).

Undernutrition is associated with impaired motor and intellectual development (Li et al, 2006: 30). Accordingly, dietary deficiency has been identified as a key risk factor for Indigenous children. In their discussion paper covering widely gathered evidence, Arnold et al (2007) state that malnourished children are less engaged, less active and have shorter attention spans, score lower in school and have less emotional control (Arnold et al, 2007: 6). One series of RCTs (evidence rating: ii) in Papua New Guinea (Pharaoh et al, 1971; Connolly et al, 1979; Connolly and Pharaoh, 1989; Grantham-McGregor, 2000: 50) found a relationship between Iodine supplementation and children’s fine motor skills at age ten. This research also found a link between maternal thyroxine levels in pregnancy and their children’s performance in cognitive functional tests at age 14 to 15 (Grantham-McGregor, 2000: 50).

Another specific outcome of child undernutrition is anaemia. A 2004 Northern Territory sample (evidence rating: v) of remote Indigenous children aged less than five years (n = 6017) found that anaemia rates ranged between 23.1 and 43.8 per cent (Li et al, 2006: 33). It is asserted that anaemia “is commonly a result of iron deficiency and has been associated with poor cognitive and motor development and with behavioural problems” (Melbourne Institute of Applied Economic and Social Research, 2001; Li et al, 2006: 33). However, a review of research on the effects of iron deficiency on cognitive development determined that the evidence is inconclusive because correlation studies demonstrate a link, but longitudinal studies demonstrate that it is difficult to isolate the effects of socio-economic status from iron deficiency (Grantham-McGregor and Ani, 2001).

Hearing problems associated with high rates of recurrent middle ear infection, leading to Otitis Media with effusion, impinge on language development and cause greater incidence of speech disorders amongst

American Indian and Alaskan Native children compared to other social groups (Marks et al, 2003: 30; Currie, 2005: 121-2). Morris et al (2005) assessed 698 children aged six to 30 months in 29 top end and central Australian communities and found that 91 per cent had some form of Otitis Media (evidence rating: v). A study by Lewis (1976) (evidence rating: iii) subjected 14 Aboriginal children with history of chronic middle ear disorder and a control group of 18 European and Aboriginal children with normal middle ear function to a battery of auditory tests. The results demonstrated that chronic middle ear impairment restricts the development of some auditory processing skills. Other studies also demonstrate that Otitis Media with effusion “can impair language development and adversely affect education” (Couzos et al, 2003: 315). However, this association is questioned (Jung et al, 2005) and accordingly, the evidence-base for the effects of Otitis Media on the pre-requisite skills for school readiness and a successful transition through school are described as controversial (Couzos et al, 2003: 315). In a practical sense, the effects of CSOM on hearing may influence school attendance. In a NACCHO (2003) study (evidence rating: ii), Indigenous children with CSOM attended 69 per cent of the school term, compared to 79 per cent for non-trial Indigenous children and 88 per cent for Non-Indigenous children, Parents of CSOM children verified this result by estimating that a third of children missed “one or several days of school per week” (NACCHO, 2003: 9).

Turning attention to child level protective factors for school readiness, the ‘Beginning School Study’, Entwisle et al (1987) carried out a multivariate statistical analysis on longitudinal data for a randomised sample of 790 U.S. children (evidence rating: iii) to assess the effect of the amount of kindergarten experience on children’s standardised achievement test scores in verbal comprehension and math concepts at the time they started first grade and over the first year of school. Their evidence suggests that attendance of kindergarten caused a cognitive ‘spurt’ early in the first year of school in terms of these indicators, especially for African-American children (Entwisle and Alexander, 1998: 356, 359-60). Other evidence demonstrates that children in high quality care have advanced social-emotional and cognitive-linguistic skills (NICHD Early Child Care Research Network, 2001 in Sims et al, 2005: 7). High quality care incorporates skilled staff, low staff-child ratios and high levels of one-to-one contact. By contrast, poor quality contexts can cause problem behaviours, especially for regular attendees (Margetts, 1999: 7). Although they may start from lower baselines than others, children with poor backgrounds, less educated parents and from ethnic minorities benefit most in terms of school readiness from high quality preschool (Entwisle and Alexander, 1998: 359-60; Burchinal, 2006: 83, 84, 86; Thorpe et al, 2005: 10; Magnuson et al, 2007: 46). However, the proportions of Indigenous children attending quality preschooling are low (Walker, 2004: 54), which limits the development of ‘school culture’ skills such as time-keeping and classroom etiquette (NTDE, 1999: 96; Simpson and Clancy, 2000: 2; Clancy et al 2001: 60). In Townsend-Cross’ (2004) opinion, these skills are important for Indigenous children fitting in at school (Townsend-Cross, 2004: 5).

It has been theorised that resilient children already exhibit characteristics of autonomy and responsiveness in preschool. They also seek out and bond with stable carers in otherwise chaotic contexts (Werner, 1990: 101-

3; 105-6; 110). Indigenous children have mobility within their extended family, which may help them to develop independence and a capacity to take advantage of support and resources where and when they find them (Daly and Smith, 1999; Smith, 2000: 29, 35; 79). In a questionnaire case study of 28 Indigenous households in Kuranda, north Queensland, 50 per cent of children were described as having other places to stay, with the “networks of extended family carers constitut[ing] an enormous reservoir of social support for the care and socialisation of children in Kuranda” (Smith, 2000: 35). In a 22 household case study in Yuendumu, Northern Territory, “research shows conclusively that Indigenous children ... are highly mobile ... Children also move independently of their parents and of each other” (Smith, 2000: 79). Such mobility undoubtedly presents problems for the consistency of children’s healthcare and education. However, it may also lead to a degree of independence which may in turn foster resilience that could help in transition to school if tapped effectively. This potential is not realised because high levels of mobility reinforce low rates of quality preschool access. Little is known of how some children achieve success in the face of risk. Such information could be used to improve the design of interventions (Raver and Zigler, 1997: 377-8).

Key family-level risk and protective factors

Parental alcohol and tobacco consumption are recognised as a major risk to foetal and child development, especially during pregnancy and the breastfeeding period (Halpern, 2000: 379; Huffman et al 2001: 15; Evans and Kantrovitz, 2002: 306-7; Olds, 2002: 163). This is because smoking during pregnancy reduces foetal growth rates and substantially increases the risk of low birth weight. Drug and alcohol abuse have the same outcomes and may cause Foetal Alcohol Syndrome (FAS) (Reichman, 2005: 102; Marks et al, 2003: 30). The Western Australian Aboriginal Child Health Survey reports rates of 46.5 per cent for smoking and 22.8 per cent for alcohol consumption among Indigenous women during pregnancy for a sample of 24,000 births (Zubrick et al, 2004: 114-20; 125-7). Moreover, Australian Institute of Health and Welfare (2003) data (evidence rating: v) indicates that “Indigenous babies are twice as likely to experience the debilitating effects of foetal alcohol syndrome ... which will affect their development” (Daly and Smith, 2005: 51-2).

It is widely acknowledged that family poverty affects children’s health, intellectual capabilities, academic achievement and behaviour (Duncan and Magnuson, 2005: 35; Irwin, 2007: 22, 23; Arnold et al, 2007: 6). Low socio-economic status has a negative effect on IQ, school achievement and socio-emotional functioning and long-term family poverty may be an important means of determining children at risk of school failure (Karoly et al, 2005: 23; 24 – Table 2.1; 52). Indigenous communities have high rates of unemployment and welfare dependency. Daly and Smith (2005) draw on data from the 2001 census (evidence rating: v) illustrating that 47 per cent of Indigenous children live in households with an unemployed single parent and 42 per cent had no employed adult living with them (Daly and Smith, 2005: 46-7). Unemployment and welfare dependency are symbiotic with poverty and stress and may contribute to the high rates of mental health disorder amongst the Indigenous adult population (Leventhal and Brooks-Gunn, 2000: 324; Daly and Smith, 2005: 45-6, 48, 49; Congress, 2004: 16). Mental health disorders are in turn linked to the ecology of

substance abuse, domestic violence (Fitzgerald, 2001: 142) and ultimately child abuse and neglect (Pulver and Harris, 2007: 99). Exposure to tensions in family relationships and other risks within the household has been demonstrated to result in “withdrawn or externalising behaviours, sometimes including overtly antisocial tendencies” amongst Torres Strait Islander children (Robinson and Tyler, 2006: 9).

“Aboriginal and Torres Strait Islander children are over-represented in the statistics on child abuse and neglect” (Broadbent and Bentley, 1997: 26) such that the under four age group are reported to be over six times more likely to have been involved in substantiated cases of maltreatment compared to the equivalent Non-Indigenous cohort (evidence rating: v - Li et al, 2006: 47). Moreover, an enquiry found that although “it is not possible to accurately estimate the extent of child sexual abuse in the Northern Territory’s Aboriginal communities”, it is a “significant problem” and is reported to undermine a child’s performance at school (National Research Council, 1993; Wild and Anderson, 2007: 57, 218). Additionally, rates of children in care are six times higher than for other Australian Children (NSW Commission for Children and Young People & Commission for Children and Young People (Qld), 2004: 25; SCRGSP, 2005: 9.3-9.7), which further exemplifies the degree of neglect of Indigenous children.

Low levels of parental education are widely recognised as a risk factor in early child development and school readiness (Huffman et al, 2001: 15; Denton and Germino-Hausken, 2000; CCCH, 2004: 10; Karoly et al, 2005: xv, 124; Burchinal et al, 2006: 80, 82), especially a mothers’ completion of high school (Huffman et al, 2001: 31). Marks and Garcia Coll (2007) have employed latent growth modelling on the United States ECLS-K dataset that includes 437 American Indian and Alaskan Native children. They identified having a parent with a college degree education as a salient contributor to development of the mathematics and reading skills of American Indian and Alaskan Native children (Marks and Garcia Coll, 2007: 667-9, 672). However, 37 per cent of reservation-based adolescents do not complete high school (Barlow et al, 2006: 1101). Similarly, in 1996, only five or six per cent of Indigenous adults in the Northern Territory had any kind of post secondary qualification, whereas the Non-Indigenous rate was 40 per cent. (Devitt et al, 2001) and NTDE (1999) reported that in remote areas, 11 to 16 year old Indigenous children had the same literacy rates expected of six to seven year old Non-Indigenous children (NTDE, 1999 in Daly and Smith, 2005: 52). Thus, in regression analysis of census data, Biddle (2007) found that the presence of a person in the family with a tertiary degree has a strong and consistent association with attendance at preschool by Australian Indigenous children (Biddle, 2007: 13). The poor educational outcomes of Indigenous Australians may therefore contribute to low preschool participation rates for Indigenous three and five year olds of 17.2 and 11.3 per cent respectively (SCRGSP, 2006: 6.4). However, there is a need for further research in this area to separate out the effects of parental education from multiple other factors including access to preschool.

Given the low education levels of Indigenous parents, strategies that the international evidence demonstrates are important for school readiness, including reading at home and providing a learning-rich environment (Bradley et al, 1989: 219, 233; Wright et al, 2000: 114; DEST, 2005a: 40; Brooks-Gunn and Markman,

2005: 143; Thomas, 2006: 10; Arnold et al, 2007: 6) are not likely to be widely implemented. Indeed, in case studies of Indigenous children's literacy development, Hill et al (1998) report that while Indigenous "parents may have the resources to teach their children their own culture, they do not always have the resources to support them in learning the literacies of the dominant culture, and they look to the school to support them in this" (Hill et al, 1998: 66). Accordingly, literature reviews draw the conclusion that Indigenous parents are poorly equipped to develop their children's cognitive skills and help prepare them for school (NTDE, 1999: 96; McGarrigle and Nelson, 2006: 2; Hanlen et al, 2007: 237). Qualitative interview responses also suggest that Indigenous parents mistrust the education system because of their own bad educational experiences (Frigo et al, 2004: 46, 55-6, Homel et al, 2006: 14).

Single parentage is a risk factor for school readiness (Huffman, 2001: 15; Beasley, 2002: 6; ARACY, 2006: 5). In 2001, 42 per cent of Indigenous children lived in a single parent family compared with 18 per cent for the total Australian population (Daly and Smith, 2005: 42) and Homel et al (2006) noted that in the Inala 'Pathways to Prevention' sample population, half of Indigenous families were single parents (Homel et al, 2006: 16). These carers may lack the "time and effort a second parent could contribute in helping the child adjust to school and do well there", though the main reason for the differential effect of family structure on school performance is the greater access two parent families usually have to economic resources (Entwisle and Alexander, 1998: 356-7).

Teenage parenthood is a risk factor because:

"Bearing children at a very early age can be detrimental to the health of both the baby and mother. Teenage mothers are more likely to experience complications during pregnancy, during delivery and after delivery. The babies of teenage mothers are more likely to be born prematurely, experience complications during delivery and to have low birthweight." (Li et al, 2006: 23)

Regression analysis on secondary datasets for developing contexts has also demonstrated that teenage motherhood can have more extreme consequences. Researching in northeast India, Ladusingh and Singh (2006) found that children born to mothers below 18 years of age were at significantly greater risk of mortality at the 95 per cent level than those of older mothers, which they attribute to maternal physiological immaturity, leading to pregnancy and birth complications (evidence rating: v - Ladusingh and Singh, 2006: 73). Additionally, Balk et al (2004) established that "higher age of mother (at the time of birth) reduc[es] the risk [of child mortality] by 20-25%" in Sub-Saharan Africa (evidence rating: v - Balk et al, 2004: 205). In Australia, "Indigenous mothers are, on average five years younger than their Non-Indigenous counterparts, and are more likely to give birth during their teenage years", such that 22.4 per cent of all Australian Indigenous births were to teenage mothers between 2001 and 2004 (evidence rating: iii - Leeds et al, 2007: 1, 42). In the Northern Territory, 30.7 per cent of teenage mothers were Indigenous, compared to 5.4 per cent for the Non-Indigenous population. There is also a contextual disparity in the proportion of Indigenous mothers who gave birth in their teenage years, with higher percentages in remote areas (rural Alice Springs region – 37.3 per cent as compared to 18.4 per cent in urban Darwin) (Li et al, 2006: 23).

Turning attention to family level protective factors for school readiness, Arnold et al (2007) drew on a wide range of research evidence which suggests that secure attachment to a stable carer is an important protective factor during the early childhood period because stable carers are considered to instil resilience, social competence (Arnold et al, 2007: 7) and self-belief (Werner, 1990: 108). In their qualitative study of children's service provision in the Northern Territory, Fasoli et al (2007) observe that grandmothers and older aunts are the traditional carers of Indigenous children (Fasoli et al, 2007: 14). However, in Homel et al's (2006) sample, Indigenous grandparents were not literate and thus poorly equipped to support their grandchildren's transition to school (Homel et al, 2006: 79). Single and teenage parenthood may impinge on the capacity of Indigenous populations to provide such support, though this review has not identified any research that demonstrates the effects of differing inter-familial child support models on Indigenous school readiness.

Key service-level risk and protective factors

Table 5.3 outlines the distribution of Indigenous populations between geographical contexts across the States and Territories of Australia using 1996 data (ABS, 1998). It is evident that the majority of Indigenous people live in urban locations (72.6 per cent). This pattern is followed in all jurisdictions except for the Northern Territory, where 60.3 per cent of the population live in rural or remote locations.

Table 5.3: Distribution of the Indigenous Population by Geographical Context, 1996

Geographical context	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
Urban	84.3	86.6	75	76.2	67.1	69.2	39.6	98.9	72.6
Rural	15.7	13.4	25	23.8	32.8	30.7	60.3	1.1	27.4

Source: ABS (1998)

Inevitably, service providers face different sets of problems in assuring access in urban and rural contexts. In their mixed-methods appraisal of 27 home visiting programs in south-west Sydney, Aslam and Kemp (2005) were informed by mainstream service provider informants that they "don't often reach this [Aboriginal] population. Difficulties these services encounter include misunderstood cultural beliefs and a general mistrust of mainstream services" and the manager of an Aboriginal home visiting service reported that transiency in the population also represents a significant problem (Aslam and Kemp, 2005: 33, 69). By contrast, access to healthcare (Brady, 1991; Penman, 2006: 42) and social services (Hetzl et al, 2004) is restricted in remote settings. Thus, a regression analysis using census data found that remoteness was statistically significantly associated with lower rates of attendance at preschool by three to five year old Indigenous children (Biddle, 2007: 13). Moreover, Frigo et al's (2004) longitudinal nationwide study of 153 Indigenous students academic progress used LLANS data and the Accessibility/Remoteness Index of Australia (ARIA) to demonstrate that "students who attended schools in metropolitan and regional areas achieved at a higher level on the English literacy assessment at both the beginning of the study ... and the

end (Year Two) than their peers in remote and very remote schools”. Rates of absenteeism were also higher amongst students from remote and rural locations (Frigo et al, 2004: 30, 33, 35).

An appropriate indication of the likely impact of remoteness and poor access to healthcare on maternal and child health is the tendency for birth weights to be lower in locations where access to medical care and other services is limited (evidence rating: v - Reichman, 2005: 103). In the Northern Territory, data from 1999 demonstrates that 14 per cent of Aboriginal children had a low birth weight and rates varied by context, with urban values of 8.9 and 8.5 per cent in Darwin and Alice Springs as compared to 18.6 per cent in the remote region of East Arnhem (evidence rating: v - NT Perinatal Information Management Group, 2002: 32). Although the proportion of Indigenous children born weighing less than 2500 grams fell from 16.4 to 14.0 per cent between 1986 and 2002 in the Northern Territory (Li et al, 2006: 24), the available data suggests a continuing disparity between urban and remote contexts (evidence rating: v - d’Espaignet et al, 1999: 26; NT Perinatal Information Management Group, 2002: 32; evidence rating: v - Stewart and Li, 2005: 39). In Panaretto et al’s (2007) study (evidence rating: iii) of the Indigenous ‘Mums and Babies’ antenatal screening project in Townsville, it was found that “residence outside of Townsville was a strong predictor of inadequate antenatal attendance” (Panaretto et al, 2007: 21).

Appropriate strategies to overcome the geographical isolation of many Indigenous communities include provision of transportation to centrally-based services (SNAICC, 2004a: 13; Congress, 2004: 16; NPHP, 2004) and home visiting. International research evidence illustrates that nurse-led home visiting programs are effective in increasing perinatal outcomes and more generally improving maternal sensitivity and toddler behaviour (evidence rating: i - Bakermans-Kranenburg et al, 2003: 208-11; evidence rating: ii - Fergusson et al, 2005: 807; evidence rating: ii - Barlow et al, 2006: 14). These outcomes are recognised protective factors for child development and school readiness. However, a literature review on Indigenous parenting suggests that insufficient provision of parenting classes or receipt of home visits discourages effective parenting (SNAICC, 2004a: 12). There are calls in the literature, chiefly via consultations with Indigenous communities for an integrated approach to early child health and education, incorporating prenatal, parenting and preschool components within ‘hub’ centres (NTDE, 1999: 11; Ball, 2003: 7; SNAICC, 2004a: 60-2; Walker, 2004: 57; Cleary, 2005: 7-8). Therefore, it is pertinent that the Commonwealth Government are currently engaged in a scoping exercise to roll-out the Olds ‘Nurse-Family Partnership’ model in Indigenous communities.

The most commonly cited and researched service-based risk and protective factors related to schools correspond closely with the ‘dos and don’ts’ of *ready* schools (Section 3). Qualitative evidence purports that Indigenous children’s school readiness is aided by the development of communication channels between Indigenous communities and school staff (Dockett et al, 2006: 141, 143), by employing bi-lingual pedagogies to overcome the language differences between home and school and developing culturally-appropriate teaching strategies (Frigo et al, 2004: 8). Another protective factor recognised through

qualitative research is the presence of culturally sensitised or Indigenous staff (particularly AIEWs) in schools who can more readily connect with Indigenous students and parents (SNAICC, 2004a: 12; Frigo et al, 2004: 48, 60; Homel et al, 2006: 15). Qualitative interviews with AIEWs suggest that those who have strong relationships with communities and teachers play an important role in “inclusion of Indigenous perspectives in ... teaching” (Frigo et al, 2004: 54). An Australian Education Union report found that inclusion of local Indigenous staff assists school transition because rates of turnover amongst predominately Non-Indigenous staff are high, which serves to undermine community-school inter-linkages (Walker, 2004: 39) and students learning. Thus, Indigenous children from a remote community studied in the ‘100 children go to school’ program had three different literacy teachers in their first year at school, employing different teaching styles and pedagogies.

To summarise research on risk and protective factors for the school readiness of Australian Indigenous children, the most distinctive observation concerns the paucity of high-quality studies. This is less the case for health research focussed on the individual child or maternal level where a few studies have produced scientific evidence. However, this evidence has not usually fleshed-out the pathways linking attributes, behaviours and health status with school readiness. Rather tending to identify risk factors as a source of early childhood developmental delay. Moreover, study findings are frequently controversial, because of contradictory evidence, rendering outcomes inconclusive. Furthermore, a lack of high quality evidence about the impact of family and community functioning, of socio-cultural and economic influence and service access and delivery negate a clear vision of the interconnections between risk and protective factors and of the pathways leading to school success or failure. There is an immediate requirement for research that employs rigorous quantitative and statistical analysis to measure how the ecological range of risk and protective factors operate contextually to influence the school readiness of individual Indigenous children. There is also a pressing need for the appreciation of how intervention studies mitigate risk factors and capitalise on protective factors to improve school readiness. Examples of high-quality studies that trace out the long term benefits of interventions and have yet to be applied in Indigenous contexts include ‘High/Scope Perry Pre-school’ (Schweinhart et al, 2005) and the ‘Nurse-Family Partnership’ home visiting model (Olds, 2002).

6 Effective interventions for the school readiness of Australian Indigenous children

This section is focused on recent interventions that have yet to appear in other reviews on topics that are germane to Australian Indigenous school readiness. Previously reviewed interventions are cited where appropriate though not repeated. Interventions from other contexts are reviewed where gaps in Australian Indigenous intervention are identified and promising, though unevaluated interventions are also discussed. In Table 6.1, interventions are categorised by the developmental stage they target and the risk factors they tackle. This section is organised by intervention focus. Appendix B offers a synopsis of studies included in Table 6.1.

Antenatal Care

Moberley and Carapetis (2007) reviewed research in this area, and identified ‘Strong Women, Strong Babies, Strong Culture’ as a community-based intervention with “encouraging reductions in low birth weight babies in comparison to surrounding non-pilot communities” (Moberley and Carapetis, 2007: 12). Mackerras’ (2001) (evidence rating: iii) found an increase in mean birth weights by 171 grams between pre – (1990-1; n = 243) and post–intervention (1994-5, n = 221) samples for three communities where the ‘Strong Women, Strong Babies, Strong Culture’ program was piloted. By contrast, Mackerras (2001) established an increase of 92 grams in mean birth weight in a non-intervention top end sample (1990-1 n = 1021; 1994-5 n = 1018).

In 1996-7, ‘Strong Women, Strong Babies, Strong Culture’ was expanded to include the Mackerras (2001) samples and additional communities that had poor perinatal health status. This study (evidence rating: iii - d’Espaignet et al, 2003) had two pre- and post-intervention groups and their respective control groups (sample size information can be found in Appendix B, page 51). Using simple regression, student t-test and the Chi-square to examine the trend in average birth weight and the proportion of low birth weight (less than 2500 grams) on the complete 1988-2001 dataset, d’Espaignet et al (2003) found “a sudden and substantial improvement [in birth weights] immediately after its introduction” relative to the control group. This provides evidence that ‘Strong Women, Strong Babies, Strong Culture’ most likely influenced the increase in mean birth weights. However the effect on birth weight was not statistically significant in new sites (d’Espaignet et al, 2003: 671). The results support Moberley and Carapetis’ (2007) opinion that there is not yet enough evidence to merit large-scale implementation of this intervention.

d’Espaignet et al (2003) stress that community control is at a cost since it affects intervention efficacy because “the intervention does not operate according to a strict protocol, but is a fluid program of individual and community support” and the “anecdotal advice indicates that the support for SWSBSC workers” in new sites “was probably less intense than that received by workers” in the original sites (d’Espaignet et al, 2003: 668, 671). Accordingly, d’Espaignet et al (2003) call for intervention monitoring with qualitative methods to identify strengths and weaknesses and improve implementation. Researchers should also study the dynamics of Indigenous community engagement in intervention more closely to improve efficacies. Similarly, more research is needed on the impact of culture on antenatal intervention. The ‘Rumbalara Medical Clinic’ and ‘Koori Maternity Services Project’ are two examples of studies that stress the positive impacts of their cultural sensitivity, although this has not been quantified (DHS, 2004: 34-5). We did not identify any other recent promising interventions for the antenatal period, but Aslam and Kemp (2005) provide useful qualitative insights on the nature of antenatal services and their effect in south-west Sydney.

Table 6.1: Quality Assessment of Interventions Salient to the Improved School Readiness of Australian Indigenous Children

	Risk Factors	Strategy/ Protective Factor	Antenatal Period	Birth <div>Age Three</div> <div>Age Eight</div>						
			Strong Women, Strong Babies, Strong Culture (d'Espaignet et al, 2003)	AI/AN Home Visiting (Barlow et al, 2006)	Child Growth in Gapuwiyak (Smith et al, 2002)	Child health and education Barunga, NT (Rogers, 2004)	Pathways to Prevention (Homel, 2006)	'HIPPY' (Baker et al, 1999; Gilley, 2003)	Indigenous Positive Parenting Program (Turner, 2007)	Exploring Together (Robinson and Tyler, 2003)
Child	Low Birth Weight	Antenatal Care	4 Effective							
	Dietary Deficiencies	Detect and Reduce Malnutrition			2 No Evidence	3 Uncertain				
	Hearing Impediments	Detect and Treat				2 No Evidence				
	Difficult Behaviour	Promote Resiliency/ Positive Self Concept					4 Effective		4 Effective	4 Effective
Family	Child Abuse and Neglect/ Alcohol and Tobacco Abuse in Pregnancy	Promote Good Parenting		4 Effective			4 Effective		4 Effective	
	Single Parenthood/ Lack of Stable Carer	Improve Family Function		2 No Evidence			Qualitative		Qualitative	
	Low Parental Education/ Inability to Support Schooling	Promote Home Educational Support						3 Uncertain		

Note: Evidence Rating Scale (Table 2.2)

Dietary Deficiencies

Earlier reviews on Indigenous nutrition intervention (Black, 2007; Moberley and Carapetis, 2007) report on the lack of evidence-based research on the effectiveness of preventative nutritional interventions. However, the importance of community support is stressed. Miller et al (2004) examined nine community-based projects in Western Australia and found that nutritional programs may be associated with improve attendance and attentiveness at school, though community ownership of the project was an important criterion for success. Other studies where weight gain and other important health effects have been observed also call for community ownership (Engeler, 1998: 63; Wartchivker, 2003; DHS, 2004: 34; Black et al, 2007: 12, 13, 16). This review identified two community level interventions that conducted nutritional supplementation. One is a community based project (Smith et al, 2002, Appendix B, page 53) which yielded no evidence of increases in child weight (evidence rating: iv, Q), the other (Rogers, 2004, Appendix B, page 52) is a small case study (of unspecified scale) of integrated health and education conducted in collaboration with school and health centre staff, where anaemia and clinic presentations are reported to have fallen (Rogers, 2004: 4), although there is no evidence of any attempt to establish statistical causality.

Hearing Impediments

Jones and Smith (2006) found some evidence of the effect of nutritional intervention on ear health and hearing outcomes (see Moberley and Carapetis, 2007: 17, 36) and although Rogers (2004: 4) described inclusion of a hearing test in baseline health screening where supplementary nutrition was provided, there is no qualifying statement regarding any effect of nutritional supplementation on hearing outcomes. The single example of evidence of impact on hearing deficiencies “in the last fifteen years” is Lehmann’s (2003: 418) study of the impact of swimming pools (evidence rating: iii). However, observed reductions in tympanic membrane perforation were not significant, so the effectiveness of this intervention has not been proven (see Moberley and Carapetis, 2007: 18-19, 38). This intervention is also limited in its practicality because swimming pools represent a spatially inflexible intervention, whereas child mobility rates are high (Daly and Smith, 2005: 53). Other limitations include cost, maintenance, provision of lifeguard cover and need to ensure equitable access. There is a need for further research on prevention methods and on learning solutions, such as inclusive curricula and teaching styles and amplification. For example, Jones and Smith (2006) note that hearing improvements in five of the 12 students in their study sample population was accompanied by cessation in requirement for teacher voice amplification in school (see Moberley and Carapetis, 2007: 36).

Child Behaviour

Homel et al (1999) provide a synopsis of interventions designed to prevent problematic child behaviour from undermining school success, preventing wider associated problems later in the life course. They note that few studies have been subjected to systematic evaluation (Homel et al, 1999: 144). Although not specifically

designed to tackle problematic behaviour, an oft-mentioned intervention is ‘High/Scope Perry Preschool’, which was delivered over two years to three and four year old children by qualified teachers. Each teacher worked with approximately eight African-American children of low socio-economic status and facilitated small and large group self-initiated learning activities. (Schweinhart, 2006) conducted a randomised controlled study with a trial group of 58 and a control group of 65 children (evidence rating: ii). The ‘High/Scope Perry Preschool study’ group experienced short-term cognitive gains, but significantly better and longer-term school achievement and behaviour improvements compared to control group children (Homel et al, 1999: 151).

Other successful interventions include the ‘Houston Parent-Child Development Program’ (Johnston, 1988), which delivered long-term behavioural outcomes among disadvantaged Mexican-American children aged one to three (Johnston, 1988; Homel et al, 1999: 145), The Abecedarian project (DHS, 2004: 43-4; Black, 2007: 24), had an African-American target population and similar long-term effects as ‘High/Scope Perry Preschool’, but started soon after birth and ran into primary school, so avoiding the slippage in academic achievement of ‘High/Scope Perry Preschool’. The ‘Incredible Years’ classroom social skills and problem solving child training program instructs children in social, emotional and cognitive management skills and has been studied in two RCTs (evidence rating: ii). The studies have found that a weekly, two-hour intervention for 22 weeks reduced aggressive and disruptive behaviour and increased pro-social behaviour and positive conflict management skills (Webster-Stratton and Hammond, 1997; Webster-Stratton and Reid, 2004: 99).

The effects of interventions on difficult behaviour have not been widely researched for Australian Indigenous populations. We identified three studies that provide low-quality evidence for intervention on children’s behaviour that is likely to improve school readiness. ‘Pathways to Prevention’ (evidence rating: iv - Homel et al, 2006, Appendix B, page 52) constitutes a suite of early childhood and family interventions in Inala, south-east Queensland, a multi-ethnic suburban community including some Indigenous families. The ‘Social Skills Program’ component of ‘Pathways to Prevention’ aims to increase socially competent behaviour and reduce problem behaviour in participating children. It incorporates elements of ‘Preschool PALS’ (Cooper et al, 2001) an Australian program using nonverbal tuition to limit English language. It also draws in culturally-appropriate ways on aspects of the ‘Incredible Years’ classroom social skills and problem solving child training program (Homel et al, 2006: 37). A pre- and post-case series study found decreases in difficult behaviour amongst four and five year old boys who participated in the program. However, only 24 Indigenous children were included in the sample of 647. Furthermore, school readiness was enhanced by their parents’ involvement in the ‘Family Independence Program’ (FIP) component of ‘Pathways to Prevention’ (Homel et al, 2006: 84-5).

Also sited in south-east Queensland, the ‘Indigenous Positive Parenting Program’ (evidence rating: ii - Turner et al, 2007, Appendix B, page 53) employs the evidence-based ‘Group Triple-P – Positive Parenting

Program’ (Sanders et al, 2002). This was culturally tailored through community consultation to help Indigenous families with self-reported child behavioural or parenting problems using active skills training sessions with small groups of parents (Turner et al, 2007: 430). In a RCT, Turner et al (2007) used Analysis of Variance on child behaviour, parenting style and parent adjustment questionnaire data. The tests established that this intervention reduced difficult behaviour amongst the children (n = 26) of intervention parents as compared to the control group (n = 25) (Turner et al, 2007: 432-3).

Both south-east Queensland studies offer convincing evidence of program efficacy, though not specifically for Indigenous populations since they include only small numbers of Indigenous participants. Moreover, being urban studies, where most Indigenous people spoke English, their outcomes are unlikely to be matched in rural or remote Indigenous communities without major re-design. However, in the very different context of the Tiwi Islands, ‘Exploring Together’ (Appendix B, page 52) has been adapted and employed to provide training on child social skills and parent’s behaviour management for improved parent-child relationships. A self-assessment exercise using pre- and post- treatment parent, teacher and child behaviour rating questionnaires was employed. The student t-test was deployed to measure a statistically significant reduction in teacher-assessed undesirable behaviour among participating children (Robinson and Tyler, 2006: 110-3). Subsequently published (Robinson and Tyler, 2008) work has compared the intervention sample (n= 40) with a non-intervention ‘surrogate control group’ (n= 48) and established that “the gains observed in the original study sample were an effect of treatment”. However, the authors recognise that the “research was not able to achieve definitive evidence of the effectiveness of the program” and accordingly, subsequent research is required (Robinson and Tyler, 2008: 7, 8, 10).

Parenting

Home visiting by a nurse can influence child developmental health and well being through early identification and referral of health problems and improvement in parental behaviour and parenting styles. Moberley and Carapetis (2007) reviewed the evidence for the impact of home visiting and did not identify any recent studies relating to the effectiveness of home visiting in the Indigenous Australian population. However, a South Australia program includes Indigenous families and is being assessed in an RCT with a sample incorporating Indigenous families. The current review arrived at a similar conclusion and turned to the secondary target - analogous populations (Section 2).

Barlow et al (2006, Appendix B, page 51) conducted a RCT (evidence rating: ii) on home visiting of American Indian adolescent mothers from reservation communities of New Mexico. In contrast with the Olds’ ‘Nurse-Family Partnership’ model, this intervention was delivered by specially trained Indigenous teachers rather than nurses, owing to community budgetary constraints and since nurses are extremely sparse on reservations. The intervention is a context-adapted version of ‘Healthy Families America’ and consisted of 41 flip-chart lessons, taught across 25 home visits (Barlow et al, 2006: 1102). Using the student t-test and the Chi-square on data for parenting knowledge, skills and involvement collected at 28 weeks gestation and

two and six months post-partum from a randomised sample of 53 participants, Barlow et al's (2006) study provided low quality evidence supporting the influence of home visiting on sustained parenting knowledge, maternal involvement and self-imagery (Barlow et al, 2006: 1102-3, 1105). This intervention illustrates that "trained American Indian paraprofessionals were able to identify, recruit, obtain consent ... and effectively implement a family strengthening home-visiting intervention". Furthermore, this intervention had lower attrition rates and higher rates of visit completion than other home visiting models (Barlow et al, 2006: 1106).

Both of the south-east Queensland studies (Homel et al, 2006; Turner et al, 2007) are designed to improve parenting skills for Indigenous families. Homel et al (2006, Appendix B, page 52) has generated low quality evidence demonstrating that the parents who undertook the 'Family Independence Program' (FIP) component of 'Pathways to Prevention' were better able to suppress the effect of risk factors on outcomes for their children compared to 'Pathways to Prevention-only' children (Homel et al, 2006: 85-6). Similarly, Turner et al's (2007, Appendix B, page 53) study of the 'Indigenous Positive Parenting Program' established that the intervention reduced usage of dysfunctional parenting strategies (Turner, 2007: 434). This was supported by qualitative evidence that parenthood offered the intervention group a higher sense of fulfilment and reward and confidence in parenting skills as compared to the control group. Both south-east Queensland studies use adapted versions of 'Group Triple-P' though only Turner et al (2007) validate the adapted 'Group Triple-P' for urban Indigenous contexts, whereas in Homel et al's (2006) study the effect of this component cannot be isolated. Rather, 'Pathways to Prevention' demonstrates the "value added by a comprehensive approach that combines child-focused and family-focused programs" (Homel et al, 2006: 86).

Family Function

Non-Indigenous and Indigenous concepts of family differ. Urban behavioural studies (Homel et al, 2006; Turner et al, 2007) have not focussed on this disparity. In rural and remote contexts where nuclear families are less influential social units, extended families form crucial support structures for Indigenous children and as such, parenting interventions need to be tailored to suit. Accordingly, the Tiwi adaptation of 'Exploring Together' pays "attention to culturally sanctioned patterns of parental response, and ideas of responsibility for dependents within extended family systems" (Robinson and Tyler, 2006: 6). Similarly, community elders have designed Western Australia's 'Aboriginal Best Start' intervention to assure the "extended family participate in the teaching and care of children" since this "will enhance the success of the projects" (DHS, 2004: 12). Quality appraisal of the effectiveness of 'Aboriginal Best Start' is not yet available.

We did not identify any high quality evidence of parenting interventions supporting extended family structures. Measuring effect may be no simple exercise, since Barlow et al (2006) found no evidence of a home visiting intervention effect on resolution of family conflict for American Indian families, which they attributed in part to the inadequacy of measurement tools and "cultural beliefs that discourage individuals

from speaking negatively about one's family" (Barlow et al, 2006: 1106). Further research is required to investigate how individuals within Australian Indigenous extended families interact to produce early child development and school readiness outcomes and to assess the implications for children whose carers are excluded from such networks. New strategies also need to be devised to measure these effects.

Home Educational Support

Besides access to quality early childhood programs, variation in support at home influences the likelihood of successful transition to school. "Studies demonstrate that reading to pre-school children, books in the home and children's own direct experience with print are all facilitative precursors for language development, reading and success in school" (Arnold et al, 2007: 3, 7). In Canada, there is interest amongst Indigenous organisations in encouraging home reading programs (BC Aboriginal Child Care Society, 2003: 47) and in Australia, in providing Indigenous texts (DHS, 2004: 6). Reading at home is also fostered through Indigenous interventions. For example the 'Preschool Intervention Program' (PIP) of 'Pathways to Prevention' (Appendix B, page 52) employed specialists to help engage families in their child's learning both at home and at preschool (Homel et al, 2006: 36), although the outcomes have not been assessed. Indeed, we did not find any high quality evidence of Australian Indigenous interventions that support early literacy attainment within the home. This is perhaps because many Indigenous parents have poor levels of education and may struggle to assist their children's early education. In the Indigenous context, an early childhood intervention with potential is the 'Home Instruction for Parents of Preschool Youngsters' (HIPPY) program.

"'HIPPY' is a two-year home-based early education intervention program that aims to help parents with limited formal education prepare their four- and five-year-old children for school" (Baker et al, 1999: 116). "The model provides parents with information and support to undertake pre-set educational lessons ... for at least 75 hours ... over the two years of the program". Additionally, "'HIPPY' has the capacity to be successfully implemented in Australia with families from diverse non-English speaking backgrounds" (Gilley, 2003: v, 12). However, studies in the United States (Baker et al, 1999: 130) and Australia (Gilley, 2003: 7) both observed high attrition rates and the need for parents to be motivated for the intervention to work with fidelity. Moreover, comparison of a RCT and case series with control group revealed mixed evidence of effectiveness in improving school success in the United States (Baker et al, 1999: 130), whereas a pre-and post- study (n = 33) with a control group in Australia suggested that the 'HIPPY' program was effective in improving self-esteem and educational attainment. These outcomes were attributable to the program intervention rather than to higher levels of attainment before starting the program (Gilley, 2003: 10-11). Therefore, 'HIPPY' has potential if shrewd decision making is employed during selection of staff, who have a great deal of influence over parental enthusiasm (Gilley, 2003: 7). Neither of these studies included Indigenous participants and care must be taken in assuring that the program is implemented with cultural

sensitivity since this could determine whether the program is successful if applied in Indigenous communities.

Finally, it is worth noting that interventions amongst older children will have an intergenerational effect on Indigenous school readiness and could make interventions such as 'HIPPY' more workable. Such interventions include Scaffolding Literacy (ACER, 2002) and the National Accelerated Literacy Program (NALP).

7 Conclusions

Given the broad diversity of Indigenous Australia, there is no singular or concise definition of Indigenous school readiness. Current wisdom considers school readiness as holistic, which ostensibly accords well with many traditional Indigenous cultural models of learning as well as conceptions of family and oneness with environment. Individual children achieve 'holistic' school readiness once benchmarks in five developmental domains (motor development, emotional health, social knowledge, language skills and general knowledge) are attained. The holistic or ecological conception of school readiness is also constituted of diverse ecological domains: ready families; ready communities; ready schools; ready services. There is a distinctive lack of rigorous research that addresses the extent to which these models of school readiness accord with Indigeneity. However, qualitative evidence suggests that the conception of ready families or ready communities for Indigenous contexts needs to consider the role that extended families play in supporting child development. Qualitative interview material also suggests that ready schools situate Indigenous culture at the centre of curricula, value the skills that Indigenous children bring to school and employ Indigenous staff. Similarly, there is a limited evidence base for what constitutes ready services, except for qualitative evidence calling for quality and access to be promoted across the antenatal and early childhood years and suggesting that continuity between constituent service components is ensured.

There is a perception that mainstream assessment tools are not effective and undervalue Indigenous skills, values and developmental processes. However, there is limited empirical evidence to suggest that this is the case because the range of developmental screening and school readiness assessment tools applied is diverse and rarely validated exclusively within Indigenous contexts in cross-contextually appropriate ways. United States assessment principles for non-English speaking children suggest that Indigenous school readiness needs to be assessed using culturally-appropriate methods and measures. Indigenous language skills are inappropriately assessed or are seldom employed effectively as an assessment tool. More effective measures for Indigenous language skills are required. The inclusion of Indigenous communities and professionals in assessment design may improve the process. Creating standardised, externally comparable and culturally-appropriate measures for the assessment of Indigenous children are areas where further research is required.

The risk and protective factors for Indigenous school readiness are broadly understood, though there remains a lack of awareness of how factors inter-connect. There needs to be more research on the ways that

constituent components and pathways vary between contexts, by maternal experience and across childhood developmental stages. Since extended family constructs are crucial ways of understanding Indigenous societies, there should be more awareness of how extended families mediate risks.

A survey of recent early childhood interventions and perusal of earlier reviews on Indigenous intervention has exposed the paucity of high quality, broad-scale evidence for effective programs. Although there is evidence for intervention effects on problematic child behaviour and promotion of positive parenting styles, this is context specific. Adaptation is a key issue, but this renders comparison of intervention effects difficult to undertake. Such interventions need to be tested more rigorously using scientific techniques. Similarly, further analysis is required to transform the high quality evidence base for the effectiveness of clinical measures into practical public health outcomes, which may require application of qualitative and ethnographic methods as opposed to scientific techniques. Home based early years interventions are crucial and proven internationally, but home visiting and home educational instruction strategies need to be designed through Indigenous consultation, trialled across contexts and rigorously assessed using appropriate measures to determine what really works. Thereafter, culturally-appropriate local adaptations can be applied with greater confidence.

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9 Appendices

Appendix A

Primary Database Search Focus

Aboriginal and Torres Strait Islander Health Bibliography (AEI-ATSIS, APAIS-ATSIS, Indigenous Australia, ATSIHealth, FAMILY-ATSIS) the Australasian Digital Thesis program; Cochrane Library; EBSCO host databases (CINAHL, Education Research Complete, ERIC, Psych Info) and Pubmed (Medline).

Search Terms

EBSCO (Academic Search Premier, CINAHL & ERIC)

measurement AND school readiness (57 records)
assessment AND readiness for school (54 records)
risk OR protect AND schoolread* (284 records)
narrowed to – child, preschool (45 records)
narrowed to – infant, preschool (42 records)
environment AND risk AND early childhood AND schoolread* (47 records)
community AND risk AND early childhood AND schoolread* (44 records)
family AND risk AND early childhood AND schoolread* (89 records)
parental AND risk AND early childhood AND schoolread* (26 records)
community AND protect* AND early childhood AND school readiness (4 records)
family AND protect* AND early childhood AND school readiness (6 records)
protect* AND early childhood AND school readiness (8 records)

Pubmed (Medline)

measurement AND school readiness (35 records)
assessment AND readiness for school (59 records)
early childhood AND school readiness (15 records)

MeSH search

"Personality Assessment"[Mesh] OR "Educational Measurement"[MeSH] AND "Schools"
[MeSH:NoExp] AND "Set (Psychology)"[MeSH] OR "Attitude"[MeSH] OR "Arousal"[MeSH] (32 records)

"Risk Factors"[MeSH] AND "Child"[MeSH] OR "Infant"[MeSH] AND "Schools"[MeSH]
AND "Set (Psychology)"[MeSH] OR "Attitude"[MeSH] AND "Environment"[MeSH] (5 records)

Appendix B

Interventions in Indigenous Australian Populations

Study: **Barlow et al (2006)**

Evidence Rating: ii

Title: Home-Visiting Intervention to Improve Child Care Among American Indian Adolescent Mothers: A Randomized Trial

Methods: RCT comparing a family strengthening intervention with a breastfeeding education program.

Home visitors (Educators): Trained American Indian women n = 4

Statistical Tests: t-test, Chi-Square.

Participants: Fifty-three pregnant American Indian adolescents from reservations in New Mexico and Arizona were randomly assigned to intervention (n=28) or control (n=25) groups. Follow-up data were available for 19 intervention and 22 control participants. Initial sample n = 61, attrition n = 8 (13%).

Intervention: A culturally appropriate adaptation of 'Healthy Families America' (designed to ensure quality of home-visiting interventions for at-risk families): 25 home visits and 41 discrete lessons taught from 28 weeks' gestation until 6 months post partum by Indigenous educators using tabletop flip charts.

Control (waitlist) group given breastfeeding awareness training.

Outcomes: Intervention mothers had significantly higher involvement scores at 2 months post partum and significantly higher child care knowledge scores at 2 and 6 months post partum.

Notes:

Study: **d'Espaignet et al (2003)**

Evidence Rating: iii

Title: Monitoring the 'Strong Women, Strong Babies, Strong Culture Program': The first eight years.

Methods: A comparison of pre and post birth weights in intervention and control communities in rural and remote regions in the Top End of the Northern Territory using NT Perinatal Data (1988-2001).

Comparison of three communities: where the program was first implemented in early 1993 (Group 1); where the program commenced in 1996 and 1997 (Group 2); their respective comparison control groups.

Group 1: Preintervention period (1988-93) n = 577 (41%); Postintervention period (1994-2001) n = 829 (59%).

Group 1 Controls: Preintervention period n = 2118 (41%); Postintervention period n = 3070 (59%).

Group 2: Preintervention period (1988-97) n = 814 (72%); Postintervention period (1998-2001) n = 322 (28%).

Group 2 Controls: Preintervention period n = 3511 (68%); Postintervention period n = 1677 (32%).

Participants: Indigenous community based program, targeting pregnant women and women of child bearing age.

Intervention: Strong Women, Strong Babies, Strong Culture Program (SWSBSC): Senior women within Aboriginal communities help younger Aboriginal women with pregnancy advice on visiting clinics for antenatal care, healthy pregnancy management and the adoption of safe practices.

Outcomes: Statistically significant increase in mean birth weight in Group1, but not Group 2 or the control group.

Notes: Follow-up study to Mackerras (2001) [Reviewed by Moberley and Carapetis, 2007]. Lack of impact in Group 2 necessitates further study of confounding factors.

Study: Homel et al (2006)

Evidence Rating: iv

Title: The Pathways to Prevention: First Five Years: 1999-2004

Methods: Case Series with Pre- and Post- test.

Preschool Language Assessment with no Instrument (PLAI) n = 584; Rowe Behaviour Rating Inventory (RBRI) n = 600; Strengths and Difficulties Questionnaire (SDQ) n = 509; Preschool teachers rating of children's school readiness; Parent surveys [pre - n = 338. post - n = 134 test]; PEDS (Parental Evaluation of Developmental Status); Family Independence Program (FIP) records; Teacher survey.

Statistical Tests -Analysis of covariance (ANCOVA); a matched pairs design; multilevel modeling multivariate analyses

Participants: n = 647 multi-ethnic 4 - 5 year old urban preschool children [Indigenous children n = 24 (3.7%)]; parents n = 338 [Indigenous parents n = unknown Family Independence Program Indigenous participants n = 66 (17.8%)]; Community insight interviewees n = 18.

Intervention: FIP – behavioural management courses from adapted 'Triple-P'; Preschool Intervention Program (PIP) – multiple child, teacher and family focussed direct skills training programs.

Outcomes: PIP - reduced problem behaviour for boys.

FIP and PIP (combined effect) - Reduced effect of risk factors and improved school readiness (of boys).

Qualitative perceptions that 'Triple P' boosted parental confidence.

Notes: This set of interventions demonstrates the power of cross-cultural and multiple mutually-supporting interventions. However, it is difficult to separate out the effects of the multiple components on parental confidence and school readiness.

Study: Robinson and Tyler (2006)

Evidence Rating: iv

Title: Ngaripiriliga'ajirri - An early intervention program on the Tiwi Islands: Final Evaluation Report.

Methods: Pre- and post-treatment behaviour rating questionnaires (parents, teachers and children); Parental efficacy questionnaires; Quantitative analysis - 'T'-tests, Pearson's 'r', Cohen's 'd' measure of *effect size*.

Participants: 57 Torres Strait Islander parent-child partnerships.

Intervention: 'Exploring Together' adapted for study. 10-week multi-group program of 6-8 child-parent partnerships. Training focusing on child social skills and parenting management.

Outcomes: Statistically `significant reduction in undesirable child behaviour.

Notes: 12.5% of Tiwi 7-12 year old children are exposed to the program each year. Bi-lingual curriculum.

Study: Rogers (2004)

Title: Program to Improve Young Children's Health and Education, Barunga Community, Remote Northern Territory.

Methods: Baseline Health Screening; Follow-up monitoring of health records; Qualitative perceptions.

Participants: Children under 13 n = unknown

Intervention: School Based Program (commenced 2001), Preschool (commenced 2002): health screening and treatment program, a nutrition program to increase the children's intake of iron.

Outcome: Anecdotal; decreased anaemia, haemoglobin at healthy levels, fewer clinic presentations and increased energy levels at school.

Notes:

Study: Smith et al (2002)

Title: Community action to promote child growth in Gapuwiyak: final report on a participatory action research project.

Methods: Child weight measurements collected monthly from health clinic; Qualitative interviews.

Participants: Indigenous children aged 0-5 n =159. Qualitative interviews n = 43.

Intervention: Action research project to improve child growth

Outcomes: Despite underweight children rates declining from 38 per cent in April 2000 to 23 per cent in October 2001, it is not possible to be conclusive about change in child growth patterns.

Notes: Some evidence of effective community engagement in early childhood intervention. Evidence of irregular medical record maintenance at a community health clinic.

Study: Turner et al (2007)

Evidence Rating: ii

Title: Randomised clinical trial of a group parent education programme for Australian Indigenous families.

Methods: RCT.

Participants: Urban Indigenous Parents. Trial group n = 26; Control group (waitlist) n = 25

Intervention: A culturally-centred adaptation of the 'Triple P' - Positive Parenting Program (group training to help parents acquire child management parenting skills).

Outcomes: Reductions in difficult child behaviour;
Reductions in use of dysfunctional parenting strategies;
Qualitative perceptions of improved family functioning.

Notes: Some components delivered by Indigenous staff and parents reported positively on cultural sensitivity. However, the outcomes of this small sample urban study of self-presenting parents may not be matched in other contexts.